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The Supernatural in Nature

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THE SUPERNATURAL IN NATURE.

THE

SUPERNATURAL IN NATURE

A VERIFICATION

BY FREE USE OF SCIENCE.

VERBUM DOMINI MANET IN ÆTERNUM.

LONDON:

C. KEGAN PAUL & CO., 1 PATERNOSTER SQUARE.

1878.

265. i. 548.

"Now, if the natural and revealed dispensation of things are both from God, if they coincide with each other, and together make up one scheme of Providence, our being incompetent judges of one, must render it credible that we may be incompetent judges also of the other. Since, upon experience, the acknowledged constitution and course of nature is found to be greatly different from what, before experience, would have been expected; and such as, men fancy, there lie great objections against; this renders it beforehand highly credible, that they may find the revealed dispensation likewise, if they judge of it as they do of the constitution of nature, very different from expectations formed beforehand, and liable, in appearance, to great objections—objections against the scheme itself, and against the degrees and manners of the miraculous interpositions by which it was attested and carried on."—BUTLER'S "Analogy of Religion," Part II. Revealed Religion, Chap. iii.

TO

THE RIGHT HONOURABLE AND RIGHT REVEREND

JOHN JACKSON, D.D.,

LORD BISHOP OF LONDON,

THIS WORK

IS RESPECTFULLY DEDICATED AS A SMALL TOKEN OF ESTEEM AND LOVE

FOR THAT GENTLE HOLINESS AND PURITY WHICH,

UNITED WITH WISE FIRMNESS,

RENDER HIM BELOVED AND HONOURED IN THE HIGH STATION

WHICH HE HAS BEEN CALLED IN THE PROVIDENCE OF GOD

TO OCCUPY.

"THOUGH one were to allow any confused undetermined sense, which people might please to put upon the word natural, it would be a shortness of thought scarce credible to imagine, that no system or course of things can be so, but only what we see at present; . . . . . the only distinct meaning of that word is *stated*, *fixed*, or *settled*; since what is natural as much requires and presupposes an intelligent agent to render it so, *i.e.*, to effect it continually, or at stated times, as what is supernatural or miraculous does to effect it at once."—BUTLER'S "Analogy of Religion," Part I. Natural Religion, Chap. i.

STATE OF THE CASE.

"Je voudrais faire quelque progrès nouveau dans la connaissance des choses divines."
EMILE SAISSET.

THE age in which we live, not without reason, boasts of great growth in knowledge and useful application of that knowledge. This breadth and accuracy, unless we exercise due care, will enrich the race at the expense of the individual. It is no longer possible for a single mind to occupy the whole domain of investigation. The student must limit his labours to one field of science; to one tree, branch, or even leaf of knowledge; if he will add any new thing to the intellectual store of mankind.

That is a noble devotion which abandons vast mines of research, and concentrates every energy to carry one single line of inquiry to the furthest limit. Such devotion, for the sake of accuracy and of discovery, involves great sacrifices; and not the least of these, though often overlooked, is a narrowing of the student's own nature. The eye, turned continually upon objects near and small, loses the faculty of far-seeking and wide discernment. The mind, wholly given to one study and its special methods, loses power and discrimination as to outlying provinces of thought.

Nowhere is the evil effect so plainly seen as in those students of physical science the minuteness and mechanical nature of whose investigations render them like the carpenter who will have everything made of wood, or, as the blacksmith who recommends iron. Their leaders must be pained to find that having scorned the statements of Scripture as too human,—rendering the work of creation too man-like,—they are reduced to the absurdity of endeavouring to find a mechanical equivalent for the world, in which the ultimate

atoms turn the key of every mystery, and possess, in some incomprehensible manner, the promise and potency of all terrestrial life.

Some of our religious teachers err by another kind of one-sidedness. Knowing but little of physics, they use exploded arguments, and seek to maintain untenable positions. No wonder that the Sacred Cause, which they endeavour to champion, is imperilled rather than vindicated.

Such an unnatural separation, on the one hand, of Science from Religion, and from all connection with holy sentiment, is a surrender, by physicists, of an honourable position; and reduces Science to an occupation of sheer curiosity and selfish utilitarianism. A separation, on the other hand, of Religion from Science, gives to our clergy the impossible task of explaining the universe without the aid of positive knowledge. As a result, even the verities of Divine Revelation, true independently of belief or unbelief, are not handled with sufficient force to obtain the conviction of scientific intellect, nor so pleasingly set forth as to win the affections of a devout will. Truths, which the greatest of mankind have thoroughly investigated and undoubtedly accepted, are now refused by the unspiritual, who, not being able to detect the soul by physical analysis; nor to find God by means of microscope and telescope; nor by any unbelieving efforts to obtain a view of the Eternal Spirit; assert—"The existence of the Soul, the Being of God, the Divine Revelation, have no other foundation than the devout aspirations of believers."

It is true that there are, specially in the medical profession, men with keen unconquerable love for scientific study; who, not possessing special religious convictions, nor having any particular expectation of pecuniary advantage, devote themselves, "heart and soul," with intense unselfish devotion, to the study of their own branch of science. These men save life and beautify it, their love of science is a sacred love, and it may be that with such men "to work is to pray."

"The thought of their laborious years doth breed
Perpetual benedictions: not indeed
For that which is most worthy to be bless'd:
Not for this we raise
The song of thanks and praise;

But for those obstinate questionings
Of sense and outward things,
Which, be they what they may,
Are yet the dawning light of better day."

For the sake of these and other truth-loving men, in danger of being beguiled by the sophisms of an imperfect science, this book is written, that, obtaining clearness and gathering strength, they may say—

"Wherefore should we be silent, we who know
The trance of adoration, and behold
Upon our bended knees the Throne of Heaven,
And Him who sits thereon?"

In a scientific work no apology is needed for the statement in detail of scientific facts. They are needful for instruction of the unscientific, and useful to the scientific as exhibiting the basis of real argument; but the highest reason for their introduction is that the true discoveries of science are themselves revelations of the Divine Presence and Work — a psalmody of Wisdom and Power.

We do not deal with the controversies amongst believers, nor with Scepticism in some of its rationalistic doubts; but with those who deny Supernaturalism, who refuse to believe in a personal God—our Creator, our Preserver, our Father. We undertake a conflict the momentous nature of which involves our highest interests: nothing less, on the one hand than the loss of everything which can elevate man; and, on the other, his degradation to a brute-nature. Those who trifle with unbelief should well understand this ultimate issue, and draw back while there is time. It is well that the Materialist should undeceive himself as to the imaginary benefits delusively hoped to result from his philosophy; should see that to unfaith men takes from them everything which can preserve from evil and lead to good; well for him to be aware that without a sense of holiness, of devotion to a Higher Being degradation ensues.

While employing physical and metaphysical arguments against the Materialist, we contend for a Revelation in an Inspired Record as an essential bulwark against error, and the only infallible guide to truth; as the corrective of scientific generalizations which would banish God from the world;

and as the teacher of moral and spiritual laws which are co-ordinate with and analogous to those physical laws which a scientific generalization has revealed. Indeed, physical science is the sister and handmaid of Revelation: no lasting antagonism can exist between them. Science has not yet far enough advanced to establish perfect accord with Revelation, but it is tending thither; and, when attained, the generalizations of science will be no longer doubtful but assured. Our aim, in this book, is to promote that agreement by showing the correspondence between truly scientific conclusions and Holy Writ; by exposing hasty generalizations which appear contrary to Revelation; and by making it plain that scientific truths, like spiritual, have for ever been descending from heaven to men.

Materialists forget all this. By mistake and misfortune, astonished by unprepared emergence from comparative ignorance of physical science to wider information, they deny that there is any science or commanding intellect apart from their own; not knowing that all the sublimest achievements of our nature are spiritually scientific. To be great, they must not only use the miscroscope of observation, but the far-sighted telescope of imagination, and verify the vision. Then they will be aware that former insurrections against Divine Truth were sustained by men of brilliant parts, of dazzling wit, of refined culture, of fascinating manners; but, when the tumult had subsided, Sacred Verities were found more firmly established, having called forth in their defence the highest intellectual powers that human nature ever displays. The Greek, the Roman, the Celt, the Teuton, rebelled against the Revelation which God gave to one family of mankind; but the Divine Oracles, because they are Divine, prevailed all the more. We have now greater learning, and higher power of criticism, but the Sacred Documents will endure a far more searching test than any they have yet received. It will again be proved, that men are not happy until pure intelligence finds relief and solution for the perplexities of existence, by those acts of beneficence and high morality which are only intelligible and possible through the con-

viction of direct relations between God and man; relations which bring into the horizon of earthly existence the lofty proportions of that celestial fane which God has built; wherein countless myriads of beings present glorious worship, and serve in splendid occupation:

> "There's not a star,
> But, in its orbit, like an angel sings;
> Still quiring to the young-eyed Cherubim."

Observation confirms this. Those acquainted with scientific progress must be struck with the fact that, of late, the more brilliant achievements have been made in dealing with the unseen. The microscopist, the chemist, dealing with the ultimate particles of matter; those who puzzle themselves with the mysteries of molecular vibration; bear the victorious wreaths of successful discovery, and show that every atom is a whirling world with wonders great as those in the splendid realms of gorgeous suns.

This connection of all visible things with the invisible; and of life with germs that possibly are not organised in the sense of being eggs; possibly, in themselves, dead as the inanimate matter and putrefiable substances out of which they creep as living things; are evidence, amounting to scientific proof, that there is a continual going forth from the unseen to the seen; evermore an awakening of life from the dead; which, whether called evolution, or creation, renders the universe a sort of enchanted valley; and adds a strange unlooked-for confirmation to expectation that the forms which matter assumes are not its real substance—not essentials, but accidents. Whether any piece of matter shall take the shape of solid, of liquid, or gas, seems a question of temperature and pressure. At last, oxygen, one of the three most stubborn gases, the ubiquitous supporter of life, has, under a pressure of three hundred atmospheres, been condensed into a liquid. Who can tell the fixed and unvarying elemental form of matter? Has it any such form? Ought we to regard it as endowed with the faculty of assuming every variety of shape according to the mere accidents of environment? Whether so endowed or not, the world we live in is one of marvels; and, if we regard it as a material manifesta-

tion of the Divine Being, the mysteries are analogous to those of the written Revelation: profound and, as to essence, inscrutable.

As verification of the whole argument, on any extended scale, would be impracticable for one man, a portion of Holy Scripture has been selected for tentative positive criticism; a portion which, as the first Divine word, and as intimately related to physical science, presents, in connection with peculiar difficulties, strange facilities for that positive definite examination which can alone content our age. Should the investigation give reasonable satisfaction, it will afford ground for belief that the same process may be successfully applied to other parts of the Sacred Volume. The verification, carried along a hundred lines of research, will prove that there is meaning in the world's work and in our earthly discipline; a supreme and attainable good to strive after; and that life is worth living, because Intelligence is at the heart of things. To our Father we say—

"Illi sunt veri fideles Tui qui totam vitam suam ad emendationem disponunt."
Imitatio Christi.

To those who by various suggestions have given aid to this work hearty thanks are tendered: specially to him who, with patience and skill only surpassed by goodness, read the manuscript, and revised every proof as it passed through the press. The accurate Index was prepared by another friend, whose painstaking merits unfeigned praise. To our readers we say—"Omnia cunctanti," everything to those who wait: for as splendour from galaxies of stars afar off, goes forth in different periods of time, and arrives at the earth in widely separated intervals; there are beams of truth travelling from the Great Source which have not yet shone upon our mind, but will surely gladden us. When the grass has withered and the flower faded, when the Scripture Record has a new setting in the light beyond the veil, we shall find, some to our glory, some to our shame, that "the Word of God abideth for ever."

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THE SUPERNATURAL IN NATURE.

STUDY I.

IS INTELLECT DIVORCED FROM PIETY?

"Christianity did not appear in a barbarous age, nor win acceptance because nations were unintelligent. The Greeks were people of highest natural power in freshest vigour, with radiant intellect pervading the sense of youthful beauty. The Roman is a symbol of the bold and clever leader, with whom to dare is to do. Men of the early Church were of earnest, heavenly-minded character—their saintly aspect was in itself a revelation."

IT has been very confidently asserted that we have not to reckon with religion; its day is gone by, the best minds of our age have forsaken theology, take no account of it, and that this is preparatory to a general abandonment of belief in the Supernatural.

The statement is improbable. All that we know of faith and intelligence assures us that the sum total in the twentieth century will be the offspring of the nineteenth, as the nineteenth is of the eighteenth, and must be—unless special, that is miraculous, illumination be given. It may be taken as certain that whatever change takes place in the symbols by which religious faith is expressed, religion, in all essential respects, will remain unchanged. Summarily to throw away ancient beliefs and institutions, to discard the universal growth and experience of moral discipline, can in no case be the work of an individual intellect, or of one age. No one individual nor age has ever succeeded in remodelling society to a prescribed ideal.

Lord Bacon says,—"Are we disposed to survey the realm of sacred or inspired theology, we must quit this small vessel of human reason, and put ourselves on board the ship of the Church." It were better not to quit "the small vessel of

human reason," but to use intelligence as a divinely kindled lamp, and this intelligence will burn brighter if fed with the oil of faith: for the religious sense, the highest which we can entertain, is based upon the aspiration and endeavour after complete fulness of life.

It is easy to understand that men of hard mechanical mind, "who," Scaliger roughly said, "lick the vessel but never touch the pottage," have little or no sense of religion; but it is not easy to understand by what right, with least power to judge of the Supernatural, they assume authority to decide that the world is nothing but matter, containing only material organisms. Why, if our own material organism is governed by intelligence. may not the universe be governed by Intelligence?

They say—"There is no actuality in the Supernatural, no reality in any knowledge we can obtain of it;" but they are well aware that the appearance of things is not their essential reality, and that every phenomenon is the manifestation of an unknown energy; consequently the Unknown is knowable, so far as He is manifested, unknowable so far as He is infinite and eternal. Every fact in history, occupying but a moment in time, is rooted in an unsearchable past, and enters an endless future; the first link hides in the past eternal, and the last vanishes in the future eternal: all nature, on one side, touches the seen, on the other, the unseen. It is an essential part of our nature to be conscious of this; the Power underlying all—the Great Reality.

In essence God is ever unknown, as everything else is essentially unknown; no term can be used in precisely the same sense of essence and the phenomenon, of man and of God; there is, none the less, an analogy; so that, in human, limited fashion, we know the Unknown; and the effort to know more, to co-ordinate emotional consciousness and intellectual cognition, is the highest, purest and most strengthening exercise of our reason.

We all admire and applaud the noble Roman, Regulus, who voluntarily returned to torture and death rather than violate duty to his country and faith plighted to an enemy. Who could interpret that man's life and mind by their material conditions? or, interpreting, would, according to material conditions, have

interpreted aright? We commend Andrew Fuller, who, willing to lose his life in order to serve his country, would not do a base thing to save it. Does not every good man say?—"I would be virtuous for my own sake, though no man should know it; and clean for my own sake, though no one should see me." The reality, the animating principle of such holy conduct, resting on universal emotional consciousness of God, is more active and powerful in life than that which is merely intellectual.

The fact, moreover, "that no human being, and no society composed of human beings, ever did or ever will come to much, unless their conduct was governed and guided by some ethical idea,"[1] renders our acceptance of that ideal not merely a requisition of common sense, but an indispensable condition to true and lasting welfare. On grounds therefore of intelligence and morality, we appeal to the good and the great whether the highest and best ideal is not found in the Bible? We ask those of high moral nature, whether its purity does not make them affectionate and reverential? Whether the things which have been surely believed among us are not still worthy of all acceptation? Whether religion does not take that place in the heart which, otherwise, superstition would usurp? Certainly it is right to urge the pure in spirit to maintain these things in integrity; for if our race lose faith in the soul's immortality, in Providence, if, on the intellectual side, we lose the recognition of Deity, and, on the emotional side, a yearning for closer union with Deity, we can neither attain nor retain the virtues, happiness and true civilisation of well-ordered communities.

There are, indeed, many reasons for supposing that human nature will expand its powers, and occupy a wider sphere of knowledge and action than the present; but that advancement, if made without the guidance of revelation, without the establishment of harmony between our knowledge and our aspirations, will rather bring more anxious cares and sharper pains than augment enjoyment, or secure and enlarge our peace. Appalling facts of the most grim and gloomy aspect prove, as Bishop Butler said, that "Mankind are for ever placing the stress of their religion

[1] "Critiques and Addresses:" Prof. Huxley.

anywhere than upon virtue;" and experience shows that sceptical men, denying Divinity, pave the way to sensualism and thence to superstition. It is equally certain that the habits, usages and propensities of millions of our fellows are not leading them forward to goodness and happiness.

The manner of argument against the Supernatural is surprising. We are told, "The teaching of Jesus carried morality to the highest point attained or even attainable by humanity. The influence of the spiritual religion has been rendered doubly great by the unparalleled purity and elevation of His own character, . . . so that the 'imitation of Christ' has become almost the final word in the preaching of His religion, and must continue to be one of the most powerful elements of its performance."[1] It "is the highest conceivable by humanity . . . Its perfect realisation is . . . extinction of rebellious personal opposition to Divine order, and the attainment of perfect harmony with the will of God."[2] Now, would it be believed that, immediately preceding, we find these words? "The disciples, who had so often misunderstood the teaching of Jesus, during His life, piously distorted it after His death."[3] We are to believe that disciples, capable of receiving, keeping, and handing down to future ages, the highest system of morality attainable by humanity—in the light of which they lived, and for the truth of which they died—"piously distorted" that system! This "spiritual religion" of "sublime simplicity and moral grandeur," putting all other systems to the blush, "uniformly noble and consistent," is really built on "mere human delusion!" Now, no folly is greater than this: to regard the Bible as true, yet full of error; pure, yet defiled by prejudice; Divinely animated, yet disgraced by fanatical assumption. As if a thing could be really of heaven and heavenly, yet animated by the devil with the breath of delusion and deceit. We are to believe, on the one hand, "no supernatural halo can brighten its spiritual beauty, and no mysticism deepen its holiness. In its wisdom it is eternal;"[4] but to hold, on the other hand, "the falsity of all miraculous pretension;" that St. Paul

[1] "Supernatural Religion," vol. ii. p. 487.
[2] Ibid., p. 486.
[3] Ibid., p. 488.
[4] Ibid., p. 489.

worked no miracles; that the birth, marvellous death, resurrection, and ascension of Jesus, are "pious distortions;" that the Apostles' testimony is full of falsehoods; that "upon all grounds of reason and experience the supposed miraculous evidence, by which alone we could be justified in believing the Divine Revelation, must be pronounced mere human delusion."[1] What a comment on the inspired words—"I work a work in your days, a work which ye shall in nowise believe though a man declare it unto you!" (Acts xiv. 41). It reminds one of a sarcastic speech—"I believe that the philosophers of every age are equally foolish, but that the common people gradually increase in wisdom."[2]

As to faith in the supernatural and miraculous, "we feel that common sense shows no difficulty in the way of belief in miracles; surely the Power which made all things may again, at any time, create or annihilate force or matter, and interfere with natural laws at His pleasure."[3] Common sense sees that the argument of unspiritual men must be pushed to the bitter end; and, if it be true doctrine, all providence, all government, all Divine interest in human affairs, must be banished from our thoughts. If these men are right, all men of piety are wrong. Kant should not have said, "Two things impress me with awe: the starry heavens without, and the moral law within." Those vastly our superiors in wisdom and virtue, whom we contemplate with involuntary admiration—admiration kindling emotions of love—are in nowise to be followed. We must take for guides men who say—"There was no creation, and is no personal God. The Old and New Testaments are legends; incarnation, redemption, glorification are fond delusions." Hume, unbeliever as he was, declared—"The whole frame of nature bespeaks an intelligent author;" but now the words of Goethe—"Matter can never exist and be active without mind," are made to mean that matter is eternal, and that the combination of matter into diversified forms of beauty, and the wonders of organic life, are without design, and unguided by intelligence. The eye was not

[1] "Supernatural Religion," vol. ii. p. 480.
[2] "Social Pressure," by the author of "Friends in Council."
[3] "Protoplastic Theory of Life:" J. Drysdale, M.D.

made to see, nor the ear to hear; the complex and compact apparatus of the human mouth was not arranged to breathe, to taste, to eat, to talk; nor legs and feet to walk and run; nor heart and lungs to circulate and purify the blood; verily, "*Nihil tam absurdum, quod non quidam philosophi dixerint.*"

The man of common sense, the man of real science too, John Hunter to wit, sees that the eye did not make itself, nor man make it, nor his parents, nor any other man; yet, that it was made by One who understood the transmission, reflection, and refraction of light; how to make lenses of different powers, adjust them for clear perception of near or distant objects; how to make and use most ingenious mechanical contrivances, in order to turn the eye in every direction, and increase or diminish light; how to place the eye so as to be of most service, protected from injury, moistened from time to time, and able to close or shut. Common sense is sure that Divine Intelligence made the eye; and, in duty bound, worships God.

If there is no Supernatural in religion and nature, then, of course, morality is without Divine sanction; there is no vindication of right, no retribution for the good. We may tell those who are sensual as swine, fierce as wolves, knavish, petulant, wayward, that there is no Judgment to come. Monsters of cruelty are not monsters, nor are they blame-worthy. Those who break the law, knowing that they shall escape the law, whom we account deserving of ten times more punishment, are to be free from all punishment if they take care of their health.

Human nature is outraged by such doctrine. We feel that the moral element is the centre of our structure; there will be, there must be, a future reckoning. Every temptation that we resist, every pure impulse discreetly yielded to, every noble thought that is encouraged, every sinful desire that is extinguished, every wrong word that is withheld, enriches our character, and testifies of a higher life. Present before any audience the spectacle of a pious, loving, watchful mother, whose son requites her unselfish, unwearied efforts for his welfare by barbarous murder, that he may seize the little savings only hoarded by self-denial for his benefit.

Will the spectators applaud that act? Will they not instantly, passionately, without doubt, stigmatise it as wrong, wicked, base, abominable turpitude? Then place before them the life of Christ, good and gentle, promising to His own hurt, and changing not, denying Himself, helping the unfortunate and unhappy, dying amidst the taunts and scoffs of His murderers, and praying while He dies that God will forgive them. That whole audience will admire and approve. In every language the voice of the multitude will be, "That man is a good man, He is a man of God." While human nature remains the same, such will be the real sentiments of humanity; so long as common sense continues, virtue will have a sort of glorious pattern coming from God and returning to God.

We are unwisely urged to abandon the Divine Record of this God-Man and of Creation. Mr Herbert Spencer writes thus against the Bible doctrine of Creation:—"Many who in all else have abandoned the aboriginal theory of things still hold this remnant." Then, speaking of a man who has not abandoned it, he says, "Catechise him, and he is forced to confess that it was put into his mind in childhood, as one portion of a story which, as a whole, he has long since rejected. Why this fragment is likely to be right while all the rest is wrong, he is unable to say. May we not then expect that the relinquishment of all other parts of this story, will by and by be followed by the relinquishment of this remaining part of it?"[1]

If all other parts of the story had been disproved, then the narrative of Creation might be imperilled; but, as intelligence widens, piety deepens, and a really scientific investigation of Revelation confirms the sacred truths, and makes our knowledge of them more accurate. Men of honourable name, world-heroes, historians, poets, the ablest students of nature are not atheists; nor are they pure secularists. The Newtons, Bacons, Boyles, Faradays, are Christians. If Materialists have lost the Spirit of Divinity, is there neither Spirit nor Divinity for other and wiser men? Take Socrates and Cicero, who lived and died before Christianity appeared; or Voltaire, who rejected it; or Napoleon, who regarded it with the

[1] "Principles of Biology," vol. i. pp. 335, 336.

genius of a statesman; all recognised Divine handiwork in the Creation. In every man, worthy of the name, there is a longing for higher fulness of life, a closer walk with God, which, whether formulated in the symbols of science or of Scripture, is the indestructible essence of all religion. It is well known that a singularly large proportion of the leading scientific men of the day are devout Christians; and we may safely hold that religion which, in time past, by organic expression in creeds and ceremonies, preserved reverence and holiness of thought and feeling, will be preserved, not destroyed, by science.

Opponents are in part aware of it: "If nature have in store a man of the requisite completeness—equivalent, let us say, to Milton and Helmholtz rolled into one—such a man, freed by his own volition from 'society,' and fed for a time upon the wild honey of the wilderness, might be able to detach religious feeling from its accidents, and realise it to us in a form not out of keeping with the knowledge of the time."[1] Another writes—"The army of liberal thought is, at present, in very loose order, and many a spirited free-thinker makes use of his freedom merely to vent nonsense. We should be the better for a vigorous and watchful enemy to hammer us into cohesion and discipline; and I, for one, lament that the Bench of Bishops cannot show a man of the calibre of Butler of the 'Analogy,' who, if he were alive, would make short work of the current *à priori* infidelity."[2]

Now, in reality, the scientific work is not so much for the priest as for the professor. Science, less than religion, can stand alone; but must freely combine with all right efforts for the betterment of men. Men of science are the priests of the material universe; why do they not, with the feelings of awe, reverence, wonder, and worship, woven into the texture of their nature, give reasonable satisfaction to holy emotion? For them also is the privilege of removing the apparent antagonism between Science and Religion—the abiding terror of timid or superficial minds; theirs the high aim to unite moral power with intellectual achievement, and all the

[1] "Fragments of Science," *pref.*, 2nd ed. : Prof. Tyndall.
[2] "Scientific Education:" Prof. Huxley.

more because out of their own province, and from men of their companionship, flows the poison-stream of unbelief which destroys the ignorant. They well know that around the intellect is the horizon of spiritual convictions from which our noblest impulses are derived; that, as the universe contains psychical as well as material phenomena, it is impossible to live for ever in the cold light of intellect only; the sublime, the beautiful, the moral supply the highest and best energies of life.

The man for whom the wedding-bells have to be rung at the union of Intellect and Piety will come: "I hope and believe, that when the world is older, and when the mutual relations of all branches of knowledge are as well understood as are now, for instance, the relation of chemistry to the theory of electricity, the scientific progress which began by rejecting religion as the basis of science, will finally accept religion as not indeed the basis, but the summit and crown."[1] Meanwhile the theologian and the student of nature must ask each other—"How readest thou?" For the book of Nature and the book of Scripture are the two books which were meant to be compared, and can never be antagonistic.

The opposition of Materialists to the Biblical manner of looking at things, is owing to the fact that they prefer cosmic or physical symbols to those which are human; forgetting that both are relatively inadequate, and both indeed equally anthropomorphic; owing, also, to the error of counting psychical changes as nothing more than an undulatory displacement of molecules; yet, further, that they make morality, even in the highest stages, nothing better than enlightened selfishness; and yet, again, to the ignoring of this other fact, that only those who apprehend in full subjective faith the mysteries of revealed religion, are capable of reasonable, sufficient, and accurate knowledge as to the life of God in the soul, and the record of God in Creation and Redemption. Lord Bacon observed—"The subtilty of nature far transcends the subtilty of the human understanding;" but professors of naturalism, forgetting that moral and religious faculties have equal authority and reality with those purely intellectual

[1] "Scientific Bases of Faith," *intr.* : Joseph John Murphy.

and mechanical, interpret only the mechanical structure of things. Using their mind to destroy mind, even while professing to live in the light of intellect, they assert, Matter, not Mind, is king.

> "He that hates truth shall be the dupe of lies:
> And he that *will* be cheated, to the last
> Delusions strong as Hell shall hold him fast.
> For men go wrong with an ingenious skill;
> Bend the straight rule to their own crooked will;
> And with a clear and shining lamp supplied,
> First put it out, then take it for a guide."—*Cowper.*

Not so the coming man, "the Milton and Helmholtz rolled into one;" realising religious feeling "in a form not out of keeping with the knowledge of the time," and aiming at the highest possible culture of the individuals, he will think in essentials as did Abraham, as did the pious cloistered monk, as did the true puritan, as do now the holy and lowly in heart; but he will put his thought in the language of a man,—not in that of the childhood of our race,—and going beneath the symbolic superstratum, teach us to rest our faith on the underlying spiritual principle; not explaining Scripture as a book which fell from Heaven, but as written by holy men who were moved of God; one side all human, one side all divine—*πάντα θεῖα καὶ ἀνθρώπινα πάντα*; "The Book of God," say "God of Books."

This coming man, Milton and Newton rolled into one, will not be an Antichrist to deny the Father and the Son, nor that man of sin who, by subtlety and force, shall renew the old delusion that men can be happy without God. We may expect clear proof that there are only two principles on which the system of the universe can be explained. 1. A Personal Intelligence creating, sustaining, ruling—this is the Christian hypothesis and will be preserved. 2. A supreme power, but no supreme being; an invisible principle, not a personal God—this really atheistic, is called the Pantheistic notion, and will be refused.

It will be shewn that only two principles of government are possible in the world—1. Providence. 2. Law. Providence, foreseeing, arranging, applying. Law, ordering, subordinating, invariable. Providence, without law, would be irregular and capricious. Law, without providence,

is necessity or fate. The doctrine of Providence requires not, but disallows unforeseen interventions; and the doctrine of law sets no limit to varieties of motion and life. The two principles, when applied, merge into one process; for as there is a world of mind, besides that of matter, and as our own mind subordinates matter by acting upon the intelligible order in it, we have proof of a twofold mental action; our own, in ascertaining and using the intelligible order; another, as manifested in that order. Providence then is the soul of law, and law is Providence in action; in other words, God governs by law. Now, it is evident that Providence must contain all law, and law administer all Providence; consequently no truly scientific man should say, "There never has been, and never will be, any intervention in the operation of natural laws."[1]

It is certain that the origin and maintenance of law are, unless every faculty fails us, by an ordaining Intelligence. Take an illustration of highest order—the Divine Individuality of Christ Jesus. He lived 1800 years ago, and was confessedly the crown and perfection of humanity. He could not have been the product of an atheistic, or of a pantheistic system of the universe: for perfection is only attainable as the ultimate outcome, as the indefinitely remote completion, of a well-nigh immeasurable period of evolution. The Perfect Man, therefore, must be regarded—not only on Scriptural, but on scientific grounds—as a providential Manifestation of the Divine Personality: for the appearance of Perfect Humanity in an age, by itself, wholly incapable of producing such a type was, in itself, a miracle. Such a break of continuity is conceivable and practicable only on the supposition of a Personal Ruler of the universe, of a Lawgiver higher than His own laws, manifesting Himself equally in the orderly sequence of Nature, and in those Supernatural Revelations which, as breaking in upon that orderly sequence, we call miraculous.

We obtain the same truth from three representatives of opposing schools of thought: "The Life of Christ," by Dr Farrar; "Ecce Homo;" and "Vie de Jesus," by M. Renan. They agree on two great facts—1. That primitive Chris-

[1] "Conflict between Religion and Science:" Professor Draper.

tianity is the true religion. 2. That Jesus, by whom it was given, is the one around whom universal history gathers. Hence it follows that the life of Christ was a real life. He undoubtedly lived and taught as the New Testament substantially represents; Providentially and by Law, He exhibited the true Fatherhood of God; lived as if with the touch of God, to quicken the dead; and, with the tenderness of God, to comfort the sorrowful. Christ was the highest and purest intellect the world ever possessed, and Christ confirmed the Old Testament record of creation, and enlarged the doctrine of God, so that in Christ we have example and proof that purest faith is married to highest reason.

Revelation, the Divine warrant for piety, far from opposing Intelligence, is a special message to our intelligence, and unites the reasoning power of the philosopher, the imagination of the poet, and the inspiration of the seer. This trinity of graces renders the power of the Bible—one book, greater than the whole literature of Greece—many books. This one Book, from a nation despised by all in former and by some in present time, holds the world in awe. It is read and preached in hundreds and thousands of churches. It is in the cottage of the lowly man, and abides with the honourable; it weaves the literature of the scholar, and sweetens the common talk of life. It enters the closet of the student, the king's chamber, and the counsel-hall. In sickness and sadness, in perils and partings, in life and death, it tempers our grief to finer issues, and gladdens joy with yet brighter hopes. Our best prayers are in "its storied speech," which tells of earthly duties and heavenly rest, as if Plato's wisdom, Newton's science, and Raphael's art, had sought to make it beautiful and good. No other book, sacred or profane, can pretend to the suffrages of so many men of great genius, of so many intelligent and educated adherents from so many nations and races, or has formed, like it, "a succession of men heroically bent on making it universal." A Book, thus winning reason's highest triumphs, the crown of poetry, and glorification by art, revealing wisdom from the depths, morality from the heights, and transforming the death-angel into a heavenly messenger; approves itself to the best

and wisest of our race, unites intellect and piety in sacred bonds by authority of God.

Professor Huxley, in his lecture on the "Advisableness of Improving Natural Knowledge," said:—"The improver of natural knowledge absolutely refuses to acknowledge authority as such. For him scepticism is the highest of duties; blind faith the one unpardonable sin. And it cannot be otherwise, for every great advance in natural knowledge has involved the absolute rejection of authority, the cherishing of the keenest scepticism, the annihilation of the spirit of blind faith. . . . . The man of science has learned to believe in justification, not by faith, but by verification."

This is only half true. Making holes and filling them up again is a waste of labour. A continual undermining of foundations renders even the firmest fabrics insecure. Observers in natural science must maintain their independence, and science progresses not authoritatively but experimentally; if, for example, we doubt whether there is on the floor of the deep ocean a thing called Bathybius, the doubt may arise from our knowledge of the analogy of nature; but he who counts "scepticism the highest of duties" should doubt concerning his doubt, and deny any actuality or reality to knowledge. "Theological habits of thought are relatively useful, while scepticism, if permanent, is intellectually and morally pernicious."[1] It is well to dig about trees, not to uproot them; and we all know, as to Scripture and science, theology and therapeutics, that the mass must wait outside and receive the result on authority. A thoughtful man has remarked,—"To bring into doubt in any way (and it is of little moment in what way, or on what pretext), that which the common sense of mankind has always assumed to be certain, is, if not to shake the evidence of all truth, yet to paralyse the faculty by which evidence of any kind is seized and held."[2]

Even in natural knowledge the researches and discoveries of the most self-reliant investigators are worked out upon the foundation laid by previous authority, whether that

[1] "Cosmic Philosophy:" John Fiske.
[2] "Physical Theory of Another Life:" Isaac Taylor.

authority be censured, or amended and confirmed; and must be matter of faith to most men, only to be justified by those who have power to verify. Would the learned professor call it intelligence or stupidity, for common men to deny everything that they do not know by their own actual verification? Is the professor's own authority to be absolutely rejected? Did he never try to overcome authoritatively a fellow-labourer by the dogmatic expression of his belief? Must the botanist try, by his own star-measurement, every statement of the astronomer; and the patient demand proof, in the physician's prescription, that the drugs will heal? Or are godly men, with their prayerful, scholarly, critical, and historical investigations, the only men whose authority is to be absolutely rejected?

Doubt, in itself, is not a mark of knowledge; but is certain proof of ignorance. At the best, it is the halting step of prudence in pursuit of knowledge, but a contemptible thing indeed when men flaunt it as an encouragement to godless unbelief. What saith another professor?—"We encounter our sceptical 'as if.' It is one of the parasites of science, ever at hand, and ready to plant itself, and sprout, if it can, on the weak points of our philosophy. But a strong constitution defies the parasite, and in our case, as we question the phenomena, probability grows like growing health, until in the end the malady of doubt is completely extirpated."[1] As to the comfort of doubt, that is downright nonsense, there is no comfort in it; uncertainty and suspense are full of discomfort. Duty, far from delighting in it, does her best to get rid of it; and, obtaining confidence of conviction, reposes and rejoices in the truth, "La Philosophie est une tentative incessante de l' esprit humain pour arriver au repos."

The argument strengthens in the region of morality and religion. Irresistible mathematical evidence would confound all characters and dispositions; subvert rather than promote the purpose of the Divine Counsel, which is to produce obedience as the free-will offering of love. Do we then ignore reason in religion? Certainly not. Religion is intensely practical, and experimentally realised and verified in the soul

[1] "Scientific Use of the Imagination:" Professor Tyndall.

of a devout man, as is science in the mind of a physicist. Faith implies knowledge; and, as knowledge is definite, the faith, confessed in our creed, is understood in the explicit and implicit meaning; and is expressed in our symbols as definitely, clearly, precisely, as is any problem in science. The shallowness, sometimes imputed to devout men, belongs rather to the narrower mental sphere of objectors, who set a higher value on a little technical knowledge than on good sense, exercised and approved by greater general knowledge. Revelation is made to reason, not to unreason; and reason is that foundation on which Divine revelation erects a spiritual superstructure. There is without doubt in the simple-minded, and in them alone, a sense of certainty in relation to Scripture, "which is neither the offspring of reason, nor the result of culture; but, like life itself, a direct inspiration of the Almighty."[1] To such men the Bible carries its own evidence, and truth, like wisdom, is seen by its own light. This spiritual discernment, the property of millions who never framed a syllogism, is the work of that faculty in us by which we recognise excellence. Hence we conclude that the material frame of man is to human intelligence what human intelligence is to piety.

Faith shrinks not from inquiry which has truth for its aim. To take the excuse of the head out of the way of the heart is well, to clear the mind helps to purify and elevate emotion. Certainly we would not have doubt come in at the window because inquiry is denied at the door; but a great hurt and injustice are done when, to use Dr. Johnson's illustration, the Apostles are tried once a-week for forgery. It is well for an age to be occupied in proving its creed; but reason, the basis of faith, must not become its substitute. Wilful continuance in doubt, so far from being an evidence of superior wisdom, indicates little love of truth, weakness of will, and insincerity of purpose. Even the seeking of proof implies not only a want of belief, but a lack of knowledge as to the things to be proved; and the sooner a man, or an age, reasonably passes from the proving to the evolving, from the arguing to the appropriating, the earlier will the real height of the argument be attained.

[1] "A Story of the Bible," p. 29: Interpreter Series.

Many a man allows the best part of his life to be crippled by doubt, and the halting so hinders his soul's progress, that old age comes like an untimely winter. He is not a tree from which God gathers fruit, but a barren and leafless trunk in a landscape of desolation. Let past years of doubt suffice for us individually, past ages of unbelief suffice for us nationally. It is time that we reproduce the many glorious examples of Scriptural piety, those ancient spectacles of truth, faith and holiness. It is time to prove that Christianity, which confessedly gives purest morality to individuals, is able to sanctify whole nations. It is time to show that in Christianity we have not only the emotion which, with loving power, holds ten thousand hearts, but the wisdom which delights and satisfies profoundest minds.

Is this capable of verification? It is capable; and though no serious man considers a popular assembly the proper court for the decision of deep truths; yet, as the verdict of public opinion checks the tendency of closet speculation to become visionary, we appeal to the general conscience whether religious faith, in its devout dynamic nature, does not, by ruling the inner and outer man, raise the whole life to a higher stage. We are sure of affirmation. It is, indeed, because religion has ever furnished sanction to morality that creed and conduct are always associated in our minds. There is not only an excellency proving every part of Christian faith separately considered, but a relation and vigour in the several parts taken as a whole, which win our love and reverence. We long for the realisation—that supreme epoch in which every man shall love the Lord with all his heart and his neighbour even as himself; when "the beast shall have been worked out," and the ape and the tiger be dead within us. Nor is that all; Scripture, in making men holy, renders them also more intelligent by giving stability and elevation of thought, with enlargement of appreciation as to the Divine. Observers of character are surprised at the remarkable betterment which is wrought in those who are called "regenerate." So soon as a man sets himself to do the will of God, he seems to be taught of God as to the doctrine. "A vision and faculty divine," or at least a moral and religious interest, possesses

him. He obtains the one great qualification for understanding Scripture, moral sympathy with God, which overcomes prejudices as well as passions, and makes the light of the Word to be the dawn of a happy day. (Jno. vii. 17.) His nature becomes cleansed and renewed. His mind, now like a photographic plate, readily receives an impression from the light of truth. His faith, based on the Word of God, grows into the realisation of Christ's work, and this produces a likeness to Christ's character. A man living in and by this faith brings forth good works, as Luther said,—"Gute fromme Werke machen nimmermehr einen gutten frommen Mann, sondern ein guter frommer Mann macht gute Werke." He has not only a triumphant elevation of spirit in magnanimity and honour, but a placid feeling of serenity and blissful contentment in gentleness and humility. He enjoys a noble satisfaction in victories obtained by self-command over the propensities of animal nature, and independence of soul in the consciousness of having nothing to hide—nothing to be ashamed of. His religion has that reasonable verification which satisfies mind and conscience; a holy, useful life before God and man.

A yet higher verification must not be forgotten. There are Bacons, Newtons, Shakspears in science and literature; there are Isaiahs, Johns and Pauls exceeding in enlightenment and privilege of revelation. Rome disciplined human will to the subjection of law, Greece instructed our reason and taste, Asia gave vividness to the spiritual imagination, but the Hebrews had the nobler task of enlightening our conscience. These Hebrews were of extraordinary toughness, and justify their being matched against evil—that deadly power which has so long baffled and hurt the human spirit; as the secular philosopher can give reasons for the excellency of Romans, Greeks and Easterns in their vocations, the Divine philosopher is able to explain the ground of faith in the Jewish mind. It was a vivid, abiding conviction of the existence and presence of God, and the possession of Divine inspiration as a permanent power. "God was to Israel neither an assumption nor a metaphysical idea. He was a Power that can be verified, as much as the fire to burn or bread to nourish. . . .

The greatness of Israel in religion, the reason why he is said to have had religion revealed to him, to have been entrusted with the oracles of God, is because he had in such extraordinary force and vividness the perception of this power."[1]

There may be men now-a-days mighty as the former sages; and, in our own time, holy ones to equal the ancient saints. Those possessing like faith and character may attain to the enlightenments and, possibly, to the revelations which adorned the old prophets. Men of due mental, emotional and spiritual calibre can rise to the high knowledge, awful experience, abiding conviction possessed by the holy apostles. If so, then we, to whom God is not only a Power but a Person, not far off, but in human flesh by Jesus, and in human spirit by the Holy Ghost, may attain heights the ascent to which our holiest men have scarcely yet begun; for, indeed, the Holy Ghost is to those who receive Him an intellectual light affording illumination to every rational faculty in the investigation of truth. All the present bubbles and ripples of every true knowledge are but the surface marks of a great spiritual stream. This stream, flowing forth from the throne of God, is as a river of paradise for the healing of all nations, the renovation of souls, and the beautifying of all lands.

There is, consequently, no ground for saying "Intelligence is divorced from piety." The best minds cleave to religion. All history proves the need of an ethical ideal; and experience shows that, without the aid of supernatural authority, moral and spiritual restraints lack power to enforce obedience. Supernaturalism was affirmed and taught by Jesus, the highest mind in the world. It is the power which gives victory to the Bible; it is that which makes the Church mighty, the priests' orders valid, the sacraments efficacious, and prayer to prevail. To doubt this is not a mark of power, but of weakness, a holding in contempt the common-sense and morality of the best and greatest men the world has ever produced. To say as some do, "that a religion divested of the supernatural, and based simply on human reason, could be more firmly established," is downright nonsense. Our faith, Divine in origin, is indeed capable of verification on

[1] "Literature and Dogma:" Matthew Arnold.

every line of argument; but persuade men generally that it is not of Divine authority, a human invention, and the conviction will weaken, not strengthen, public and private morality: that power which is alone capable of holding society together during perilous times. The message must be accredited, the ambassador must have authority. One from the invisible and intangible must give other and different proof of his office than one from the visible world. Divinity is that proof, and the only one. The assertion, "morality would be purer without Divine sanction, hope of resurrection, and expectation of future life; for freedom from consciousness of responsibility, and awe of future judgment, would lead to more disinterested conduct," is a fatuous delusion, sets at nought all experience, takes away encouragement from the good and restraint from the bad. It is the mystery, the grandeur, the sense of the supernatural, the love of wonder in our own nature, which, acted upon by the Bible, reacts upon its truths, precepts, promises, and marvels, investing them with sublime spiritual majesty.

We have historical proof that virtue, or pure morality, has not been able to maintain itself in the earth, or to thrive by the light of nature alone. Our duty may be seen by that light, and be proved by reason, but additional sanctions are required. The men of to-day are not the only ones who have talked of regenerating the world by means of the arts and intellectual lights; but from first to last it has been a degeneration. History shows that men drag down Christianity; how, then, can the origin and continuance of it be accounted for without extra-mundane means? Genesis iv. 19-22, affords a striking illustration of the relative nothingness of those arts. In Lamech's family are represented three great grades of civilisation—agricultural, mercantile, sensual; and Lamech, a murderer, is the first recorded polygamist. Did that ancient civilisation emancipate the world, or enslave it? Did the strife maintained by those mechanical sensual Cainites against the Sethites lead to a moral and spiritual victory? What was the result? The Cainites found themselves under the water with their organs, their implements, and their beauty; but the Ark, which they had

ridiculed as an ungainly and retrograde structure, rode in peace over their heads.

There were centuries in which the Sophists ran their career; when Socrates, Plato, and Aristotle taught at Athens; when the school of Alexandria was founded and Euclid wrote his Elements; when Archimedes propounded theories and principles in mechanics and hydrostatics; when Pythagoras experimented on harmonic intervals, Hipparchus and Ptolemy studied the stars, and anatomy began to be investigated as the basis of scientific medicine; did they win the world from misery, regenerate one heart, or save one soul? When the science of ancient Greece had cleared the world of fantastic images of false divinities, when the scientific method was well nigh completed by the union of induction and experiment, was this science the salt of the earth? Did the scientific intellect go on and possess the universal mind? The impact of atoms being accounted the all-sufficient cause of things, were men satisfied with the operation? The whole world answers—No. From the minds of philosophers was dissipated "every thought of a deflection of the universe by the gods," but neither sage nor simple was content. Literature, arts, refinement, luxury, gave much outward fineness, softness, and finish to manners; the old poets, orators, sculptors, painters, philosophers, were a wonder, but Juvenal and Perseus among the Latins, Lucian amongst the Greeks, and St. Paul of the Hebrews, testify that society was a sink of sensuality. Why? Because Intellect was divorced from piety.

The ethics of Plato, Aristotle, Zeno, Cicero, are in some respects admirable; but they had no authority from Divinity, and failed. The ablest people of whom history bears record is unquestionably the ancient Greek. "The average ability of the Athenian race is, on the lowest possible estimate, very nearly two grades higher than our own—that is, about as much as our race is above the African negro."[1] This race did not go on to possess the world. Though highest in products of the understanding, fairest of all men in form, and cleverest in art, they speedily became servile and sensual,

[1] Galton's "Hereditary Genius."

intolerant and fierce. Like the Romans, they fell into moral putrefaction, which slew them. When science has done the utmost, and art has put her finest finish on work, only Frankenstein's monster is produced, which slays them both. Art and science are good as the handmaids of religion, as adorners of morality, as lighteners of labour, as smoothers of nature's asperity; but, when put instead of religion, and held up as gods, they perish like children of Cain.

The gutter-child, by intellectual drill, may be converted into "the subtlest of all the beasts of the field;" but we know the original of that description. History, human experience, and scripture alike testify—"Where there is no vision the people perish" (Prov. xxix. 18). "It is impossible to show by what practical measures religious feeling, which is the essential basis of conduct, can be kept up without use of the Bible;" while experience proves that the purest morality and noblest life are formed by its precepts and examples. "The inability of laws to attain even the imperfect end at which they aim, is proved by the fact that in all ages and in every condition of society, an authority superior to their own has been called in to sanction and maintain them. Religion is that authority."[1]

Social and moral direction is a far more important object than scientific enquiry, and the wickedest of men allow that a life guided by the rule of Christ's morality, and governed by Christ's authority, is the noblest of which we are capable; while even lowest ranks find that by Christ's rule they are enabled to perform the highest actions of virtue.

There are, among the opponents of scripture, some high-minded honest men. The laureate lauds them too much—

> "There lives more faith in honest doubt,
> Believe me, than in half the creeds."

I only believe him so far as old John Newton was wont to say—"Some men's doubts are better than other men's certainties." The character of other doubters whose heart, not head, is at fault, has been quaintly sketched by an old writer—"Sinners perched on the dunghill of their vices,

[1] "The Great Problem: can it be Solved?" Rev. G. R. Gleig, *Edinburgh Maga.*, Jan. 1875.

clapping their wings in self-applause, and fancying themselves much grander creatures than the Christian; who all the while is soaring on high like the lark, and mounting on his way to heaven." There are dishonest sceptics, professing to be wise, whom Tennyson describes—

> "'Law is God,' say some: 'Not God at all,' says the fool;
> 'For all we have power to see is a straight stick bent in a pool.'"

To all such, these are my only words—

> "Though the mills of God grind slowly, yet they grind exceeding small;
> Though with patience He stands waiting, with exactness grinds He all."
>
> *Longfellow.*

Amongst the higher and more honest infidels, some of scientific power have little imagination and small spirituality, fail in reverent heed of Scripture, and consequently are not whole or comprehensive men. They amass, and sometimes systematise facts, and unsparingly devote the best years of their life to one class of ideas, but their mechanical process on things fails when applied to thoughts, because a partial apprehension of general truth, and the attempt to formulate nature as wholly material and external, narrow their minds. Good in technicalities, but incapable of wide range, they are specially unfit for the elevated themes of theology, which are in the widest sense universal. From the habit of contemplating phenomena in which uniformity of antecedents and consequents obtains, they cannot refrain from the assumption that nothing was, is, or can be at variance with their constant but limited experience. They explain the external structure of the world indeed, but according to the technic of man, taking no account of the spiritual and internal. The mechanism is all, the maker is nothing in their theory; nevertheless, their own doctrine of continuity proves that the visible is the actualisation of the invisible, and the natural a passing of the supernatural into history, or as Schelling too pantheistically expresses it: "Nature is visible mind, and mind is invisible nature;" or putting it more correctly and scientifically, "the phenomenal universe is the manifestation of a Divine power that cannot be identified with the vitality of phenomena."

Professor Tyndall infers that Aristotle, praised as a physi-

cist, was wholly unphysical; and says of Goethe, "He could not formulate distinct mechanical conceptions; he could not see the force of mechanical reasoning; and in regions where such reasoning reigns supreme, he became a mere *ignis fatuus* to those who followed him."[1] It may be said with equal fairness, that scientific men, in pursuit of the merely mechanical, neglect their best and greatest work, the establishment of intelligent enduring alliance between Religion and Science; the shewing that they wage battle for one and the same cause —the cause of truth, of goodness, of beauty, of God. Like Lucretius of old, they affirm: "Nature is seen to do all things spontaneously of herself," when nothing of the kind is seen, for the energy that works cannot be identified with the phenomena. They pretend to find in the chance clash of atoms the world's ground plan from origination to completion, for some, even of those who own God to be the cause of all things, assert that He is the explanation of nothing: "Dieu est la cause de tout, mais il n'est explication de rien."[2] They profess that inorganic matter, unaided by God, contains the promise and potency of all life; yet of this life, concerning which is such positive affirmation, they know little or nothing: "it is the continuous equilibration of the organism with its environment," that is, the art or power of living! They so express the law of conservation of energy as to bind the world in the chains of fate, leave no place for God, no liberty for man, no soul for eternity, and strangely enough, count this conservation of energy in the things that are, a sort of means by which those that are not began to exist. They claim regard as clear witted men, who live in "the high and dry light of intellect," yet wholly forget, for any pious purpose, that every meal we eat and cup we drink of, illustrate the mysterious control of mind over matter, and of higher law subordinating lower. They know that, even as to geometrical truths, more is required than axioms and definitions —there must be intuition of the figures, and knowledge besides that of experience; yet not being able to see the Unknown by introspection of what they know, they would

[1] "Address before the British Association at Belfast, 1874."
[2] M. Scherer.

deprive others of all that knowledge which grows out of spiritual experience.

In the Secular School, human morality is identified with brute selfishness, and conscience is declared to be "a hoarded fund of traditionary pressure of utility." Shall we waste our time with these men, and try every possible way of going wrong? Life is too short. Religion satisfies a moral and spiritual yearning, which cannot be otherwise appeased. Intellect and Piety unite in worship of the Great Supreme, whom to know is eternal life. Brothers come with us, and escape the horrors of Richter's dream. He passed through unknown shadows, darkling around an empty altar. On the church dome was a dial plate barren of figures, but a dark figure pointed at it, and dead men sought to see and read. Be not like those men, pointing at the figureless dial-plate of unrecovered centuries. Be not those blind, trying to read where nothing can be read; not those deaf, listening where no voice can be heard.

The best thinkers in every science give up the despairing creed, and decide for religion. The great facts and doctrines of Revealed Truth are becoming more and more approved by accurate thought. The light of Revelation illumines the invisible world; we not only look into certain apartments of the material universe, but behold within them many forms of spiritual grace and grandeur. While we look, our constitution and faculties enlarge in conscious existence, and we become almost other beings in impassioned emotion and intellectuality. The promise and prophecy of higher and imperishable corporeity, which will ere long be fulfilled to believers, increase every present enjoyment. New melodies and harmonies, continually breaking in upon the soul, are delicious refreshments, and assurances of heavenly help. The strength of our intellect delights in the words of inspired narrative and in its glorious acts. Intelligence unites with Piety in proclaiming that God is the source of all and the disposer of all; that the birth of a human being is not a less manifestation of Divine Power than is the exit of a human being in chariot of fire. The ordinary and extraordinary acts of Divine Government are known to be relatively, not essentially,

different; and, having this knowledge of the Supreme, marvels and miracles are rightly regarded as special messages and impressive signs. Without repugnance, therefore, we admit the Divine element in religion, only weaklings refuse it; and we hold that, beyond controversy, Divinity is the very life and soul of Nature. Those apologetic commentaries, or excusing expositions, which were formerly accepted, do not satisfy our nicer feelings; nor will our surer confidence try to evade intelligent inquiry. We have a firm, rational hold of historic evidence, and due knowledge of physics and philosophy, attesting the origin and continuance of Revelation. We disregard the petulant outcries of irreligious persons, who denounce all who know and believe more than themselves, and dare to say they know. After due inquiry, it is not so much that we consent to retain our faith in Holy Scripture, as that Scripture retains us. The inquiry, renewed again and again in different ages of the world and periods of life, affords a consecutive accordance of innumerable affirmations. Book after book, chapter after chapter, verse after verse, and word after word, have their own history, their own criticism, with pleadings for and against. There remains no softening to save our pride; it is not we who hold the Bible, the Bible holds us, consecrates our affections, and crowns our intellect. "The purer the light in the human heart, the more it will have an expression of itself in the mind of Christ; the greater the knowledge of the development of man, the truer will be the insight gained into the increasing purpose of Revelation." Intellect is not divorced from Piety; Piety is the crown of Intelligence.

STUDY II.

THE SUPERNATURAL.

"A Presence that disturbs me with the joy
Of elevated thoughts; a sense sublime
Of something far more deeply interfused,
Whose dwelling is the light of setting suns,
And the round ocean, and the living air,
And the blue sky, and in the mind of man:
A motion, and a Spirit that impels
All thinking things, all objects of all thought,
And rolls through all things."

WORDSWORTH, *Tintern Abbey.*

WE are apt to forget, in listening to denials of the Supernatural, that they enter a region of thought where absolute demonstration, in a scientific sense, is impossible. When told by Renan that, not from one process of reasoning, but from the mass of all modern sciences, we have proof that there is no Supernatural,[1] the violence of the assertion carries us away for a moment from the fact that there neither is nor can be scientific proof of that which is so confidently affirmed.

The origin and continuance of the Bible cannot be accounted for by purely human forces, nor can all events be explained by mechanical adjustment. All history and all experience prove that love and belief of the Divine flourish in heathen, Christian and scientific minds; that, indeed, the conviction of the existence and omnipresent operation of "the King eternal, immortal, invisible, the only wise," is the universal thought of humanity—adapting itself alike to the history, the poetry, the speculation and the science of every age. We may advance to the proof step by step.

[1] "Ce n'est pas d'un raisonnement, mais de tout l'ensemble des sciences modernes que soit cet immense résultat—il n' y a pas de surnaturel." Renan, "Etudes d'Histoire Religieuse," p. 206.

The First Cause.

If a man who had searched the universe in every part were to say, "There is no God," his statement would not be worthy of credit; from such a search God might hide Himself. Atheism is, therefore, as to proof, impossible. The Absolute, indeed, cannot in any manner or degree be known, in the strict sense of knowing. That is to say, the essence of God is inaccessible and incomprehensible. None but God can understand what God is in Himself, or the nature of the bond which binds the Divine attributes in mysterious unity, consequently no rational being can properly deny the existence of that concerning which, essentially, he knows nothing.

Denial of the Supreme, as founded on the fact of "not knowing," is irrational and unworthy of credit. In like manner the assertions,—"Matter alone is eternal and divine;" "There is no agency in the world other than physical agency;" "Nothing exists that is super-material, or supernatural," are sought to be justified by the unknowableness of the things denied. Thus, strange to say, ignorance, which has nothing, gives nothing, concerning those things, presumes to deny their existence. We cannot accept the denial. Knowledge reveals that every cause of phenomena as it is investigated leads from the known to that which is utterly unknown; all accountable and natural facts are unaccountable in their essence, and unknowable in their ultimate genesis. The great master fact is the unknown.

Reverse the argument. The existence of matter or of energy from eternity is incomprehensible, even as is the existence of God from eternity. Knowledge of either is impossible; nevertheless, despite the impossibility, we cannot enter any inquiry concerning causation without eventually postulating some First Cause. We are forced to do this from sheer inability to follow out an infinite series of causes. This First Cause is infinite, for if not, we must think of a region beyond its limits and uncaused, which would be, virtually, to abandon causation. The First Cause must likewise be independent, have no necessary relation to any other being; for if

the presence of anything else is necessary for completeness, it is dependent and not the First Cause, therefore the First Cause is infinite, is independent, that is, supernatural.

The position is unassailable and opponents beat a retreat. "The consciousness of an inscrutable Power manifested to us through all phenomena has been growing ever clearer, and must eventually be freed from its imperfections. The certainty that, on the one hand, such a Power exists, while, on the other hand, its nature transcends intuition, and is beyond imagination, is the certainty towards which intelligence has from the first been progressing. To this conclusion science inevitably arrives as it reaches its confines; while, to this conclusion, Religion is irresistibly driven by criticism. And, satisfying as it does the demands of the most rigorous logic at the same time that it gives the religious sentiment the widest possible sphere of action, is the conclusion we are bound to accept, without reserve or qualification."[1] If we apply to this, the Inscrutable Something, Anselm's definition of God,—"That than which nothing greater can be thought"[2] —we have, in the latest result of science, an acknowledgement of the first great truth of Scripture, that God is the mighty inscrutable Power who transcends all our understanding.

This Power, of which every phenomenon is a manifestation, acts through all bodies, animate and inanimate. If a stone is thrown into the air, or falls on the ground, it is according to definite laws; if a crystal is formed in a solution of salt, if plants grow and flower, if animals are propagated, if there are perception and formation of thought in man, all these, though Omnipresence is "unthinkable," are the sensible manifestations of a Divine Power immanent in the Cosmos—are proof of the omnipresence of mystery.

This inscrutable Power, the ultimate Cause of all things, can only be thought of as possessing specific attributes. The forms of our consciousness are such that the Absolute cannot in any manner or degree be brought within them. We are unable to form any idea of eternity, infinity, omnipotence, omnipresence; we must get notions by means of duration,

[1] "First Principles," p. 108: Herbert Spencer,
[2] "Proslogium, cap. 2, 3, 4."

expansion, acts of power, and of pervading presence like that of gravity. It is a matter of necessity to think of these things in this manner; so, for definiteness, we must conceive of God as personal, infinite, all-wise, mighty, and everywhere present.

Against the doctrine of a personal God, it is asserted—the existence of evil proves that such personal God is not infinitely good; or, if infinitely good, He is lamentably deficient in power, or in intelligence; otherwise, evil would not be allowed. The assertion loses all weight from the fact that we cannot conceive of free beings existing without a possibility of evil; their freedom forbids the exercise of omnipotence to avert it, but not the drawing out of a greater good by its permission. We are also told—that which we know of intelligence implies a circumscribed and limited kind of being, adapting its internal processes to other processes which are external. Really, to talk in this way is to play fast and loose with things, for we can just as well think of Infinite Intelligence as we can of Infinite Power. We are assured—"A personal God is a limited deity; personality and infinity are terms expressive of ideas naturally incompatible." This again is mere play upon words. Can these men, who so talk about God, explain what they mean by infinite extension, as applied to the Supreme? Is infinite extension more correct, or more easily comprehended than is infinite intelligence? We must take phenomenal conceptions such as can be framed, we know that they are inadequate to represent the Ineffable Reality; but, seeing that He is a reality, we consider that mental conceptions are of a higher order than physical. To call Personality, Goodness, Intelligence, anthropomorphic in their nature is, indeed, to give them their right title; but, to forsake these and adopt energy or motion, mechanical in place of intellectual terms, is not less anthropomorphic, and forsakes the higher for the lower, Personality as much transcending material conceptions as Humanity transcends the crystal or the sea-weed.

It is possible that there may be a mode of being as greatly transcending intelligence and will as these exceed mechanical motion, but our minds are utterly incompetent to form even

an approach to conception of such a Being, and we are not responsible to any Being, whoever and whatever he may be, of whom we cannot know anything. We are to think of God as transcending all thought, yet dwelling in our thought; as without parts and passions, yet as manifested in our every limb, and abiding in all our affections. We are to worship this God, not only with the silent, secret, mysterious homage of the inner man; but also with those external, decorous, reverential observances, which, giving outward and visible form to the acts of the spirit, constitute true worship. To plead as an excuse for failing in this due homage, by body and soul, that the Wonderful Being whom we all acknowledge, whom our knowledge lights us to, and our emotions lead us to, must not be thought of as a Person, but rather be reduced to a vacuity—a sort of aureity without the gold, thought without mind, principle without person, so that by means of this incomprehensible nothing we attain to something higher than personality and intelligence—may, indeed, assert a transcendental difference, but eliminates everything essential from worship, and takes even the possibility of reasonableness from piety.

Those who insist that God is eternally and infinitely so far above us that all intellectual and emotional exercise on the high theme is but an insult to Godhead, are in danger of losing that soundness of mind by which alone right judgment is formed, for it is impossible continually to seek that from which they are ever thrown back with a deepened conviction of the impossibility of either knowing or finding; and, ceasing to exercise themselves in these high efforts, they become incapable of making them. Nor is that all: a transcendental Being, infinitely above intelligence and emotion, is a pure negation, and all argument concerning Him is based on the delusion that nothing can be more rationally realized than something; but to regard the Unseen Reality as the absence of everything we can imagine, whether bad or good, is unnatural, irrational, and unbecoming. "Unnatural," because human instinct universally yearns after a future life and knowledge of God. "Irrational," for we are able to understand well enough many things about God; and that the Divine

Being is eternal, unchangeable, immaterial, omnipresent, omniscient, almighty, is a far more reasonable belief than the gratuitous assumption that He is unlike everything that all the manifestations of Him would lead us to expect. "Unbecoming," for it divests Deity of all that appeals either to intellect or emotion; and, so far from elevating, degrades Him to an eternal motion, an inscrutable power, neither to be loved nor feared. To say—"The Ultimate Cause cannot in any respect be conceived by us, because He is in every respect greater than can be conceived;" and then to tell us —"Matter, motion, force, are better symbols of the Unknown Reality than are our highest conceptions of supreme will, goodness, wisdom," is not to forsake personality for something higher, but to give a dreary beetle-view of God. Deity is something more than the universe. He cannot be identified with Nature, and yet He is no absentee God, sitting idle and outside His world, but dwells in it as His star-domed city; without Him not a sparrow falls to the ground, while through every star and grass-blade, but mostly through man's soul, beams the glory of His presence.

Of course, it can be objected that, however sublime may be the idea of a Personal God and Creator, we can do no more than assign to Him exalted human attributes. If the objector means that by Person we understand an infinitely intelligent, thinking Being; and that by Creator we mean that this Person is everywhere present, pervading the material universe indeed, but distinct from it, and superior to it; if he says that we look into nature for physical signals of an everliving will, and read the universe as an autobiography of an Infinite Spirit, repeating Himself in miniature within our spirit; this represents our views with sufficient clearness. Personality is not used in any sense of limitation, but as the mysterious aspect of the Dynamis, the omnipresent Energy, to whose eternal decrees we submit, and on whose constancy we implicitly rely. We decline to call Him Power, or Matter, or Motion. The Name of the great "I Am" has ever been in essence unpronounceable, but we say, "God is Spirit," and we are kept from attributing human or material attributes to Him by the unsolvable mystery being formulated as a

Trinity in unity; and there is a likeness in this mystery of Three in One, or that other mystery of three—past, present, future, which are but one "Now," to the Supreme. In those shapings of our thoughts, formulated in the doctrine of the Holy Trinity, which are for ever striving after higher and purer ideality, we are guarded against imputing the feebleness of man to God.

Revelation of the Godhead.

1. If we say that the universe is the autobiography of an infinite Spirit, then nature is a revelation of the Supernatural, whom we adore as the eternal, life-giving Principle (Ps. xix. 1, Rom. i. 20): "a power to which no limit in time or space is conceivable, of which all phenomena, as presented in consciousness, are manifestations, but which we can only know through these manifestations." Here is a formula legitimately obtained by the employment of scientific methods, as the last result of a subjective analysis on the one hand, and of an objective analysis on the other hand.[1]

Unity of science being the reflection of the unity of the Reason and Intelligence pervading nature, our own reason and intelligence being part of nature, are also a miniature autobiography of the Infinite Spirit within our finite spirit. Mind, the thinker and investigator, is a seer concerning the presence of the living God in the world. Thus, the revelation of the Almighty to man is twofold: external, in the phenomena of nature; internal, by the consciousness which takes knowledge of those phenomena or manifestations.

2. These phenomena divide themselves into good and evil. There is a soul of goodness in things evil, and a heart of truth in things false; a taint of evil within the good, and a grain of falsity in our apprehension of every apparent truth. Our consciousness and actual experience show that this good and this evil germinate out of something apart from ourselves. No man's luck, so to speak, is pulled by only one string, nor do events happen simply because they are bad or good, "else all eggs would be addled or none at all."

[1] "Cosmic Philosophy," vol. ii., p. 415. James Fiske.

Life, and all things with which we are acquainted, have their congruities and incongruities. The definite view thus arrived at, is a result not based on one, but on all concrete experience, is an induction from universal consciousness, and ranks in certainty with the postulates of exact science.

3. This verity, growing out of contrariety, is the common foundation of those religious ideas concerning God, Good, Evil, Creation, which are almost, if not quite, universal. Ideas different, yet allied; neither accidental nor factitious; not superficial but deep-seated; not evolved, nor slowly accumulated and organised; but, however degraded or distorted or magnified, striking deep roots into our nature. They affect men's interpretations of the simplest mechanical accidents, the most complicated events in the histories of nations, the diverse habits of thought, the different orders of minds, the good or ill tone of feeling, and the daily conduct of life. To suppose that they are groundless, so shakes the foundations of human intelligence, that nothing can be relied on. That doctrines of good and evil are priestly inventions; that in every society, past and present, savage and refined, certain members of the community combined to delude the rest in one and the same way, is not tenable, nor does an artificial origin account for the natural facts. These natural facts are indeed the ground of intelligent consciousness as to good and evil; the foundation of the moral sentiment which responds to them, not the creations of that sentiment, and that sentiment is as normal as is any other faculty. Hence, religion resting upon our consciousness of good and evil, that consciousness being based on experience, has the authority of Divine revelation.

4. View this with more accuracy :—

Religion, everywhere present, and, with science, organising facts into the mass of human experience, are the weft and the warp of history. Both have their near and visible side, the Natural; the remote and eternal, the Supernatural. Each holds a truth, the needful complement of the other; and when our mind is capable of realising the utmost conceptions of both, discoveries will be on a grander scale. We find,

"as the history of every age witnesses, there is an undeniable religious need that clings to human nature, a need of recognising a something above nature, and of fellowship with the same, which only asserts itself the more forcibly the longer it is repressed. The predominance of that worldly bent of mind which will acknowledge nothing above nature, does but call forth in the end a stronger reaction of the longing after the supernatural; the prevalence of an all-denying unbelief invariably excites a more intense desire to be able to believe."[1] If this were discoverable only in an individual, or belonged only to one age or one race of men, it might be ascribed to imagination, or be the result of a peculiar mental tendency, but it is found in all alike. There is something in mankind that is not wholly satisfied with the objects of the senses, but recognises, or believes that it recognises, another world of spiritual beings with whom, for good or evil, he is related. This consciousness has been a source of wealth to all language and literature. "It would seem that the progress, indisputably invariable, cannot be explained by the hypothesis of a received tradition handed down from earlier races or imaginary superior beings, but is to be attributed to God's spirit working in man."[2] We mean that when the vividness and intensity of the intellectual emotions surpassed the ordinary and extraordinary limits, they partook, or were enabled to partake, more and more of that supernatural on which the original consciousness is itself based. Hence, our consciousness of the supernatural, or revelation of it in the soul, seems a fundamental verity, and the origin must be sought higher in the stream of time than the goings forth of the rivulets of mythology, sought in man's essential nature, even in the original impulse to godlike productions.

5. Now enter that branch of operation called miraculous. It is not essentially more marvellous than the growth of tree from seed, but we do well to consider an objection. "Miracles, or the intervention of the Deity in human affairs, are, to the scientific thinker, *à priori* so improbable, that no amount of testimony suffices to make him entertain the

[1] "Neander's Church History," vol. i. p. 15.
[2] "God in History," vol. iii., p. 306. Bunsen.

hypothesis for an instant." The assertion must be met with thorough denial: most scientific thinkers, and of the highest mental power, accept both the possibility and the actuality of miracles. Consider the meaning of such over-confident assertion. It is that a miracle seems an event without a natural cause; we say "the cause is Divine, or may even be a hidden natural cause." A miracle is essentially incomprehensible, and so far as we can understand, an impossibility. We reply: It is the height of presumption to restrict Divine action to our own understood line of things, and then call our restriction "natural law." The multiform revelations of an Omnipresent Power are not identifiable with nature, nor limited to it; for scientific enquiry, working independently of theology, has led to the conclusion that the dynamic phenomena of nature are a manifestation of an Omnipresent Power transcending nature; therefore, every real advance in knowledge is certain to make us acquainted with other and higher modes of Divine action. Can a man think out the creation of matter, or the eternity of matter, or the annihilation of matter, or explain the *modus operandi* of spirit on matter, or of matter on spirit, or of the persistence of energy—that is, of energy without beginning or end? Even if he can, he is unable to subject the action of Absolute Being to his own analysis.

If we know anything at all, it is that the vast synthesis of energies without us and within us are only known as they affect our consciousness. Who dreams that these are the only powers? The series of our conceptions are but the register of our experience, and generate beliefs, from which the component conceptions cannot be torn apart, consequently the universal belief in miracles is fundamental. Not only so, it is proof of an internal process or correspondence of our circumscribed being with the infinite reality; and this finite thinking, or conception, is specially that faculty which takes the impress of Divinity, and is the ground of all deep faith and solemn adoration.

Our process of study,—1, The Divine autobiography, or image of Intelligence; 2, The existence of good and evil a real existence; 3, The world-wide consciousness of these as

the ground of our moral sense; 4, Religion as the universal conviction and witness; 5, Miracles as possible and actual; leads through various passages to inner chambers of investigation:—i. Is the universe self-existent, without beginning, eternal? ii. Is it self-made? iii. Was it created?

The first is atheistic, and offers no solution of the mystery. It is wholly incapable of conception. To assert self-existence is the denial of causation, and when we deny causation we also deny commencement. We must add to the absolute impossibility of conceiving this the fact that we have to endow matter with all the powers of mind, and give to that which is dead all the properties of life; making matter, to all intents and purposes, God. Doing this we fall into the old heathen homage of nature, and worship Power—the phenomenal God. "To worship Power only," Dr Arnold said, "is devil worship." Another has said, "What can be more arrogant and unbecoming than for a man to think that he has a mind and understanding in him, but yet in the universe besides is no such thing; or that those things which, with the utmost stretch of his reason he can scarce comprehend, should be moved and managed without any reason at all."[1]

The second is pantheistic, and cannot by any symbolism pass into real conception. The nearest approach is to conceive potential existence passing into actual existence, or existence long remaining in one form, then suddenly, and of its own accord, passing into another form; but that involves the idea of a change without a cause, which is impossible. Moreover, whence the potential existence? This requires accounting for, just as the actual existence, so the same difficulties meet us; and there is no escape except this,—Nothing developed into something, or that the world of phenomena is practically the Deity, and is finite, which is absurd.

The third hypothesis, theism, which involves creation by Divine agency, is adopted by the most, the best, and the greatest of mankind. "There is, I believe, no system of philosophy whatever in which that notion of a higher power than our own, which we mean by God, is wholly absent. The name may not be there, and even the formal idea of a God

[1] "Cicero De Leg.," Lib. ii.

may be specially denied, and yet the thing itself may remain, so inextricably is it bound up with all human experience."[1] The creative process is not to be represented as a product of manufacture, though the proceedings of a human artificer vaguely symbolise a method by which the universe might be shaped, but as the ever-changing multiform revelation of an Omnipresent Power, who can in no wise be identified with its manifestations. The production of matter out of nothing is the real mystery; but as we are not only obliged to assume some cause, but also a first cause, or we cannot speak of causation, in that cause the conclusion is reached—the Godhead.

In reality and strict reasoning every one of these suppositions, though verbally intelligible, is, through our limited capacity, incapable of actual cognition, and science cannot possibly give any explanation. We search for one in Scripture and find it. Having found it, science educates heart and intellect to love, reverence and partly understand it. John Locke says,—"My right hand writes while my left is still; what causes rests in one and motion in the other? Nothing but my will, a thought of my mind; my thoughts only changing, the right hand rests and the left hand moves. This is matter of fact which cannot be denied; explain this and make it intelligible, and then the next step will be to understand creation."[2] Professor Huxley, "Critiques and Addresses," states,—"If anyone is able to make good the assertion that his theology rests upon valid evidence and sound reasoning, then it appears to me that such theology will take its place as a part of science."

Verified theology is scientific. Can we show that our theology is verifiable, and, therefore, scientific? Try. No theory of phenomena, internal or external, can be framed without postulating an absolute existence. We speak of this absolute existence in the singular number, because the order of manifestation throughout all mental phenomena is the same as throughout all material phenomena—there is unity. If the order of these manifestations, say, for example,

[1] "The Bible and its Critics," Sect. v., p. 193: Rev. Edward Garbet.
[2] "Our Knowledge of the Existence of God."

the complex and organised correspondence of the mind with its environment in arranging and combining various experiences received from without, and in adjusting new inner relations to new outer relations, is found to correlate with the moral facts of redemption and sanctification, and to produce the highest and purest morality, the experimental process verifying this must be scientific.

If the other, or material order of manifestations, is given in an ancient book, written by a primitive, unscientific race at a time when men had little or no conception of that scientific generalisation which now arranges in correlated groups widely separated phenomena; and possessed little or no understanding of that natural adaptation of means to ends, of which the world is now known to be full; if, nevertheless, this book, claiming to have been dictated by the Spirit of the Almighty, gives such a formula of the origin and growth of things that science, however it steps in advance, does but more clearly explain and firmly rest in the ancient conception and revelation; it is clear that the process of verification is both theologic and scientific; and the integration of all natural forces into a single agency, one grand entity, God, is one of the grandest, yet primitive, conceptions of humanity, and the profoundest of scientific truths.

Without revelation, taking science only for our guide, we run out the whole sounding line of human knowledge into the depths of nature, and find no bottom; we soar and soar in heavenly heights, but only to discover that there is something beyond, which, nevertheless, comes to us, is in us, and in everything around us, and then we go and sit with the dim-eyed old man, the genius of unbelief described by Coleridge, who, in his cold and dreary cave, "talked much and vehemently concerning an infinite series of causes and effects, which he explained to be a string of blind men, the last of whom caught hold of the skirt of the one before him, he of the next, and so on, till they were all out of sight; and that they walked infallibly straight, without making one false step, though all are equally blind."

Glad to escape from unbelief, we endeavour now to obtain some conception of revelation and the account of creation,

by studying,—1, The manner or wording of the Divine narrative; 2, The truthfulness of the record.

1. "The Bible has well nigh for ever seemed against the science of the day;" there are reasons for this disagreement. Had the account of creation accorded with the science propounded in heathen times, or as asserted in Greece and Rome, or even with that of our fathers during the last century, it would now be contemptuously rejected as utterly false. "A revelation of only so much astronomy as was known to Copernicus, would have seemed imperfect after the discoveries of Newton; and a revelation of the science of Newton would have appeared defective to La Place; a revelation of all the chemical knowledge of the eighteenth century would have been deficient in comparison with the information of the present day, as what is now known in this science will probably appear before the termination of another age."[1]

In language, our glorious old Bible remains as at the first, unchanged amidst changing interpretations. Only the meaning of the words, when they struck on the ears or flashed into the minds of the first auditors, has to be recovered, so that we may stand with Moses, with Isaiah, with the Apostles, to hear the words of God, and to fix our eyes on the Son of Man, who was "God manifest in the flesh." We remember that God's words and thoughts are a light not for one age, but for all ages; and that which seemed written for the old generation only, is for our admonition also; not in the words and forms used by physical science, for all past time, and nearly all men are unscientific; and not in philosophical order, but in a form, like seed, that may lie in any crevice of the heart, with power of growth to fill the whole understanding. It contains, within the outer body, a soul or inner life, which, while agreeing with the imperfection of our nature, raises us above it; and, in answer to the inarticulate cries of conscience, pours the wisdom of God into our every mode of thought and figure of speech. He who is susceptible of that inner life, and catches the spirit of it, finds lessons for childhood, strength for manhood, and is embued with the capabilities of heroes and prophets. Thousands know by actual exper-

[1] "Geology and Mineralogy," vol. i. p. 14: Francis T. Buckland.

ience that the Bible is a book which grows with their growth; and, as knowledge of it increases, deeper depths of wisdom are revealed. St Paul utters their experience—"O the depths of the riches, both of the wisdom and the knowledge of God" (Rom. xi. 33). At present, none but religious men accept, as fact, the continual revelatory character of the Book; but every candid enquirer will ultimately acknowledge it.

The language and unscientific form of the account are greatly found fault with; and thus spoken of by the undevout, "that superlative nonsense, known as the doctrine of special creation."[1] Again, "Obviously a theory which was framed in a barbarous age, when men were alike unfamiliar with the conceptions of physical causation and uniformity of law, and ignorant of the requirements of a valid scientific hypothesis, and which has survived until the present day, not because it has been universally verified by observation or deduction, but because it has been artificially protected from critical scrutiny by incorporation with a system of theological dogmas assumed to be infallible; obviously such a theory is at the outset discredited by its pedigree."[2]

The assertion, as to the account having been "protected from critical scrutiny," is not true; no other book or account has been assailed so ably, so critically, maliciously, constantly, as this; and it survives not because of protection, but because opponents have been beaten along the whole line of argument. The Book verily did arise amongst men "alike unfamiliar with the conceptions of physical causation and uniformity of law, and ignorant of the requirements of a valid scientific hypothesis," nevertheless though, as Sir Thomas Brown saith, —"Time sadly overcometh all things," this Book has conquered time; and, despite the "superlative nonsense known as the doctrine of special creation," is received as the Book of God by all nations eminent in arts and arms, in wealth, civilisation, and refinement.

Revilers of the Book insist that the figurative expressions are to be taken literally, there is no symbol, no figure, no allegory. They tell us the Bible asserts "untold

[1] "Cosmic Philosophy," vol. ii., p. 321 : John Fiske.
[2] "Cosmic Philosophy," vol. i., p. 438.

millions of organic molecules, of which an adult mammal is composed, rushed together at some appointed instant from divers quarters of the compass, and spontaneously grouped themselves into vegetable, fish, bird, beast, man." These asserters are in such a stage of scientific culture, that they tell us—"He who can believe that St Goar of Treves transformed a sunbeam into a hat-peg may believe such an account." We cannot help smiling to find that these clever men thrust a meaning into Scripture which only the simplest and most unscientific ages accredited, and throw in the face of a world of Christian thinkers, versed in every science, their dictum that this is the meaning, and that "the superlative nonsense" must be received as a true exposition of our faith. Of course they are not in the least conscious that thus to malign the most wonderful Book in the world, and to charge our greatest scholars in theology and science with gross stupidity and credulity, proves their own folly.

The Book says that vegetable, fish, bird, beast, man, all came forth from the ground by a Divinely given power. Is it a fact or not? It is a fact; for modern science proves that the grass on which the sheep feeds, and the sheep itself; the fish in water, and bird in air; with man the king of all, are traced back to microscopic germ-cells of nitrogenous and hydro-carbon compounds pre-existing in the atmosphere and soil. Not only so, the Scripture account states that plants, fish, birds, animals, man, came in definable order; the lower forms preceding the higher, as in a series of God Almighty's days. Not the horse, nor ass, nor zebra, nor quagga, were created separately; the earth was their common father, by means of God-given power, and, doubtless, in strict adaptation to the conditions of life surrounding them.

A modern scientific man might count it very much better thus to describe the creative process from a dynamical point of view. An organism became an organism by a complex aggregate of matter in which permanent, structural, and functional differentiations and integrations were rendered possible by the fact that it continually received about as much motion as it expended. The life of such an organism is a perpetual balancing of external forces by internal forces.

The career or advance of an organism, or of a group of organisms, consists of two kinds of equilibration, which we designate as external and internal equilibration. The adjustment of organisms to changing external circumstances is partly by adaptation and by partial destruction; so that natural selection is indirect equilibration. The whole process, internal and external, may be thus summarised—

Equilibration	External	Direct	.	Adaptation
		Indirect	.	Natural Selection
	Internal	Direct	.	Heredity
			.	Correlation of Growth
		Indirect	.	Use and Disuse.[1]

The above is not a jest, it is science, good science too; but who will prefer it to the first chapter of our Bible? and, after all, it is only the abstract statement of that which the Bible gives in concrete form.

2. The Scriptural account differs as widely from other cosmogonies as truth from fiction. Those trace the origin of life from some primeval matter, or look upon the world as pantheistical, or derive gods and men from a world-egg. The Bible reveals a Personal God who is near to every one of us; and creation as the act of that God, not of unwilled fortuitous processes of nature—not by unguided interaction of atoms and atomic energies, but by a process of production according to law—Law not originating itself, but the Divine rule of procedure, so that we may know what God has done—what God is doing—what God will do.

Creation in this manner, or, as we now say, "according to law," could not have been scientifically known by any man of the era in which the record was written; we may think, not even by the inspired writer. If this latter statement appear too bold, let it be remembered that the plan of Scripture is so vast and wonderful, that even angels do not fully understand, but delight to investigate; that the prophets, who prophesied, received not prophecy for themselves—but for us; and that inspired men saw not to the end of the things in which they ministered (1 Pet. i. 10-12). If the account, the

[1] "Cosmic Philosophy," vol. ii., pp. 64, 65 : John Fiske.

facts, the order, are true, real, actual, such knowledge could come from God only. This conviction led that distinguished naturalist, Linnæus, to claim admission in natural science for the Mosaic account. Cuvier and Agassiz, the great majority of scientific men, and the most intelligent of the civilized world, have accepted it; and, if now the precision of latest investigation, as we shall endeavour to show, approves it; there will be presented exactly the evidence needed to convince accurate thinkers of our own time, that the narrative of creation is simple, comprehensive, wonderful! How could a Jew, whom some call "semi-barbarous," and his cosmogony, "an incubus;" a Jew, without a shred of modern science, (whatever shrewd guesses he may have acquired from "the wisdom of the Egyptians"), as to astronomy, or geometry, or geology, or physiology, or chemistry; a Jew, who, speaking out of his own thoughts, would probably say that the earth was flat, and centre of the system, sun and stars moving round; write a correct, or even an approximately correct, account of creation? How, indeed, unless God taught him!

The advocates of materialism reject the Divinity, and dispute the accuracy of Scripture; but materialism investigates only a small portion of the world. Concerned only with matter, unbelieving as to spirit, they are modern Sadducees. Recognizing physics, not metaphysics; knowing but the natural, nothing of the supernatural, not even acknowledging it; materialists are like the Greek sculptor. Moved by the high aspirations of his nature and nation, in one of his best moods, he pictured to himself ideal strength, beauty, and grace. He embodied the thought in spotless marble, and gave the statue to his countrymen. Alas! he and they worshipped it as god. Do not materialists sculpture and arrange matter, find, that it is subject to certain laws and assumes beautiful forms; then fall down before this matter? Their minds subdue it, explain its operations and government, make a show of it in experiments, and metamorphose even its nature, yet they set it up, with Energy and Space, as god! as if it had the promise and potency of all life terrestrial and heavenly. Not the great minds, not the profound thinkers of our day, do this. Not those who are noblest in conception

thus empty God of divinity, of emotion, of intellect, to put in place thereof physical properties; nor will we. No Fetish worshipper was ever brutish enough to imagine that a stone fell or a star shone, or fruit was sweet, because the god inside made it fall, shine, or be sweet; nor will we, at the bidding of materialists, worship the levers, the pulleys, the cranks, the cords of nature, and forget the Holy One. We cannot detach him from the world, no, not if we would; nor cut the wires of the great Operator, nor demagnetize His needle; matter may be as the iron, but mind is the magnetic energy coming into it; matter is set in motion, mind is the energy which sets it in motion—the mind of God. The more thoughtful a man is, the more firmly will he be established in the ancient faith—"he may even find in the evidence of the intimate relation between mental activity and physical changes in the brain the most satisfactory grounds which science can afford, for the belief that the phenomena of the material universe are the expressions of an Infinite Mind and will, of which man's is the finite representative."[1]

There are two reasons, apart from a special creation, why materialists ought to accept the doctrine of a Personal God:—1. God, though essentially incomprehensible, can be, and is, known of; 2. We know of God, even as we know of mathematical truths.

1. In allowing that God, as to essence, is unsearchable; that we can only know the relative and finite, because the Infinite, the Eternal, the Almighty, can alone look into the Divine Nature, or understand how and why God is; yet we may know of God.

The finite, indeed, has no proportion in comparison with the Infinite, nor the imperfect with the Perfect; but those who, on account of this ignorance, would deprive God of personality, and represent Him as Power, render the world as necessary to God as God is to the world; without God, no world, without world, no God; God partaking of the imperfections, changes, and infirmities of the world. This, so far from giving a juster and higher view of God, degrades Him, and defines Him to be Power without motive,

[1] "Mental Physiology:" Dr W. B. Carpenter.

Wisdom without purpose, Love without object. Again, looking at nature, we behold government by law, the lower existences serve with blind obedience; ascending, we find in plants an obscure vibration of life, amongst animals is consciousness, within man is a higher principle of intelligence. This intelligence leads to the conviction that wisdom is at the heart of things, and that the whole world is a manifestation or revelation of that wisdom. Suppose that we forsake the guidance of intelligence, or that intelligence decreases, then man sinks into the brute, and the further descent is from brute to plant, and from plant to inorganic matter; but holding fast by intelligence, then, in the measure an organism is enriched, moral and intellectual faculties, delicate sensations, memory, imagination, reason, will, are possessed, the supreme conviction is attained that wisdom is a great reality. Our footsteps are firm in this argument. We know not why God is, nor how we imperfect creatures are, by existence united to the Perfect; but there is no contradiction to truth in the fact that our knowledge exercises itself concerning this wisdom, until we have conception of a Being immanent in all phenomena.

2. The things thus known of God form part of our knowledge in much the same way that mathematical truth is wrought in our mind. Our consciousness says, "we think, that which thinks exists." To this axiom or primitive truth, *ego*, is added the consciousness of other existence, *non ego*. Then we advance in thought—we imperfect beings cannot be self-existent, but exist by will of the Perfect. If so, space, duration, the universe in its vast display of existence, are manifestations of the great Existence. By the duration of hour, day, year, we obtain a notion of time, if not of eternity; by the extent of an edifice, and by motions in space, acquire an idea of space, if not of infinitude; and by triangles, globes, squares, attain to knowledge of mathematics; and still pursuing, we advance, rising from concrete to pure abstract truths, until we rest in Him who is the grand Entity—"I am that I am," in whom, by whom, and for whom all things exist.

Honour is due to those devout men whose science fits

them to be priests of the physical universe, to unfold its mysteries and explain its powers. Tracing natural things to natural source and cause, they show that the provisions of nature are not from the sun-god, but from the Lord God. Their understanding of the works of God enables them to rejoice in the light, behold the enlargement, and reverence the dignity of the Divine Word—the letter stationary, the meaning progressive; the ancient signs, as time advances, becoming sacred symbols which shine with greatest beauty when the light of far off days falls on them. Entering within the curtains of the literal word, these men proceed in spirit to the most holy place of the sanctuary. Drawing near with the incense of devotion, kindled by the light of science in the well-prepared vessel of an experienced intellect, they worship before the mercy-seat of Jehovah. Then coming forth to exercise their office, they consecrate every school of thought, every platform, every lecture room, as temples in which are expounded the will, the design, the work of Him in whom they live and move, and have their being.

"Bless'd are they
Who in this fleshly world, the elect of Heaven,
Their strong eye darting thro' the deeds of men,
Adore with steadfast unpresuming gaze
Him, Nature's Essence, Mind, and Energy!
And gazing, trembling, patiently ascend,
Treading beneath their feet all visible things
As steps that upward to their Father's throne
Lead gradual."

S. T. COLERIDGE, *Religious Musings.*

STUDY III.

THE THRESHOLD OF CREATION.

"Thou from primeval nothingness didst call
First chaos, then existence;—Lord, on Thee
Eternity had its foundations—all
Spring forth from Thee; of light, joy, harmony,
Sole origin;—all life, all beauty Thine."

SIR. J. BOWRING.

SOME of us limit, and lightly toy with the Creator's attributes: profess to scale the awful heights of infinity, and to build a godless world by means of a sufficiently enlightened human intellect. Now, while we would not fix any limit to the knowledge which we may acquire as to the constitution of matter, nevertheless, far as we may manage to go, something will lie beyond. No doubt a particle of matter is less complex than the universe, but that particle, all in all, is infinite, and who shall compare the two? Suppose we have compared them, it is simply preposterous to imagine that we shall ever scientifically trace the continuity of molecular processes into the phenomena of consciousness; therefore, it can never be proved that "matter is the origin of all that exists." It is certain that, even within our natural bodies, we possess a consciousness which cannot be materially explained; and that this consciousness makes itself at home in other and wider worlds where only pure spirits dwell.

Other men, thinking thereby to honour the Almighty, speak of the universe as created by the breath, fashioned by the touch, and launched from the hand of God: likening Him to a mechanic, and His work to a machine. Whereas, the phenomena of the world can only be known as they exist in relation to our intelligence; and the vast synthesis of energies within us, which from infancy till the end of life are in manifold contact with vaster energies without us, can

never be known in objective existence, or as to the nature of their cause, but simply as affecting our consciousness; therefore, to say that Divine energy produced the world by methods analogous to human methods, and that the laws of nature and manifold harmonies of the universe arose from quasi-human volitions, is to err with the materialists, who limit the Divine operation to their own finite conception.

It is quite true, Scripture so describes that portion of the Divine dominions with which we are connected, that for long time most men thought that the world was brought suddenly into existence, and has since remained substantially unaltered. Indeed, past, present, and future are continually spoken of as the now—the present. Things yet to come are often regarded as already existing. The slow operation of many ages is not unfrequently represented as of immediate and quick performance. In prophecy, in poetry, in mystical passages, in parables, the same style prevails. It is, we conceive, the most suitable and simple for the high subject of creation; but as we are informed that the Father worketh till now, and of creative processes proceeding in many other planets, suns, and systems, we must not remain in our former childlike conceptions, but acknowledge that the works of the Almighty are progressive and infinite, that He and they surpass all understanding.

In endeavouring to obtain some conception of that which surpasseth conception, think of time hasting away, preceded and followed evermore and evermore by other time; which, however retraced as to the past, attains no beginning, or extended into the future, finds no end. Represent space enveloping smaller space, itself enclosed by greater and ever greater; yet, wherever the boundary is set, infinity lies beyond, containing all, itself by none contained. Contemplate existences manifold in number, form, degree, vast movements of worlds innumerable. Adding billions of cycles to the past, we are still far off from that beginning when Christ was Son, and worlds had birth (Jno. i. 1-3); and when, at command of Christ our Lord, the mystery of sin shall have been accomplished, its solemn lessons learned, and time no more, then we shall not be at the end, for

new worlds of fairer form and perfect beauty will own His sway.

Chastened by these conceptions, enter the threshold of Creation.

Our first step is an enquiry whether any barrier in the past or future stayed, or will stay, the operation and progress of God.

If the world had a beginning, and nevertheless is infinite, then we must suppose that from any instant, say the present, an infinite series of creations has gone forth. This is absurd; for it is the property of an infinite series that neither first nor last can be found. An infinite world—that is a world consisting of infinite parts, requires an eternity for their enumeration. Suppose that the world is not infinite in extent, nor eternal in duration, then we have a pre-existent eternal void in which could be no creation; for why at any one moment more than another? And beyond this world would be an infinite space, to which the world must have some necessary relation, which is also absurd; for what relation can the world have with nothing?

It may be said, and justly, this language is somewhat paradoxical and inexact, for eternity is not time; neither coming nor departing, it is and for ever. Time is measured by the world's changes, and all duration is comprised in two series, the past and the future. Add these together, and they form time, not eternity. As to space, we conceive of it as involving (we know not why) the essential element of three dimensions; but mathematicians are yet undecided as to whether it has precisely the same properties throughout the universe. An inhabitant in space of two dimensions only would be incapable of appreciating the third dimension, but would certainly feel a difference in passing from his space to other portions which were more curved. "So it is possible that in the rapid march of the solar system through space, we may be gradually passing to regions in which space has not precisely the same properties as we find here—where it may have something in three dimensions analogous to curvature in two dimensions—something, in fact, which will necessarily imply a fourth-dimension change of form in portions of matter,

in order that they may adapt themselves to their new locality."[1] Now, with God, the universe is not dual nor fragmentary, but an infinite whole. As to space and time, it corresponds relatively with the Infinity and Eternity of God: therefore, no idea of ours can approach the vastness of creation; and in vain we inflate our conceptions as to the extent of time. The children of imagination are nothing in comparison with the reality. "It is an infinite sphere of which the centre is everywhere, and the circumference nowhere."[2] Hence, we conclude that God is for ever, and infinitely all that He is. Creator, He creates eternally. The world is not by caprice, by chance, by hazard, but of reason and purpose Divine. It must stand in our human conception associated with the beginning of revelation as to the eternal Son.

All this is miraculous, but we are told—"Science has no room for miracles, for by miracles we understand an interference of supernatural forces in the natural course of development of matter."[3] Again—"As far as the eye of science has hitherto ranged through nature, no intrusion of purely creative power into any series of phenomena has ever been observed."[4] Examining the facts on which such statements are founded, the whole philosophy stands self-convicted of inadequacy. It has no explanation of the origin of things. It does not and cannot formulate the whole series of changes passed through by matter in its passage from the imperceptible to the perceptible, nor from the perceptible to the imperceptible. It begins explanations with existences which already have concrete forms, and leaves off while they still retain those forms. Manifestly such existences had preceding, and will have succeeding histories. The assertion—"There is no interference of supernatural forces in the course of nature"—is based on ignorance of the origin, the continuance, and end of things. It assumes that everything is known, when, in reality, not one thing in the world is fully known, but escapes from our every

[1] "Recent Advances in Physical Science," p. 5: P. G. Tait, M.A.
[2] Pascal: "Pensées."
[3] "The History of Creation," vol. i., p. 60: Prof. Haeckel.
[4] "Apology for the Belfast Address," p. 548.

research into the unknown. It forgets that "information, however extensive it may become, can never satisfy inquiry; positive knowledge does not, and never can, fill the whole region of possible thought."[1] The protestors against miracles protest too much.

Even the method of procedure in the blending of mind and matter in the bodily structure of sentient and rational creatures remains a mystery. Will any one state whether Body is the necessary means of bringing Mind into relationship with space and extension, or of giving it connection with place and time? Will not the explanation require an explanation? What is the link joining the stupendous machinery which traverses the fields of space, wherein worlds are massed into spheres, revolving with double, treble, or manifold measurement of time in diurnal and annual rotation? Have we sufficient knowledge of the cycles of seasons, and of the changing eccentricity of orbits, either to take them out of, or fit them in to, the purposes of universal government? Can we say whether or not the vast horology of nature is a register to spiritual creatures? Can the knowledge of Materialists occupy and monopolise all this sphere? Nay, and yet the mind will continue to dwell upon these things. Thus, at the very threshold of creation, we are met with occurrences which exceed our present experience, and set at nought material philosophy.

Taking nearer things: In what relation do emotions, which are often of the most violent kind, and are neither merely animal nor organic, not purely intellectual nor moral, mingle with other elements of our nature; so that we have sense of fitness, harmony, beauty, sublimity, terror, or their opposites? How do we explain that there is now, and must ever be throughout all future time, an unascertained Something—an Unknown on whom all phenomena and their relations rest? And that at the uttermost reach of discovery there arises, and must ever arise, the question—"What lies beyond?" This, so far as we are concerned, is miraculous, less explainable than would be a voice from the sky. To call it natural is to declare that Nature is a grand miraculous entity.

[1] "First Principles:" Herbert Spencer.

Take the mechanical view: Physical science asserts, "Nature does not allow us for a moment to doubt that we have to do with a rigid chain of cause and effect, admitting of no exceptions." Enlarge this statement: The theory of gravitation demonstrates that the hosts of Heaven are parts of a vast mechanism, and that the phenomena of Nature are expressible in terms of matter and motion, resolvable into the attractions and repulsions of material particles. On these principles of materialism, our mind, if sufficiently expanded, would be able to follow natural processes from beginning to end. It could see the molecules taking their position, by mutual specific attractions and repulsions, the whole process being the play and result of molecular force. Given a grain of wheat, an acorn, an infant, and their environment, expanded human intellect could trace out, *à priori*, every step of the process of growth; and, matter being given, we could, by the application of purely mechanical principles, fashion and furnish a world. Well, suppose we admit it all, which we do not, what then? Even on these principles, "we are obliged to regard every phenomenon as a manifestation of some Power by which we are acted upon; though Omnipresence is unthinkable, yet as experience discloses no bounds to the diffusion of phenomena, we are unable to think of limits to the presence of this Power."[1] Hence, the nature of things, their mechanical adjustment, leads to the conception of an Omnipresent Energy.

If it be said—"Everything that comes into Nature, or is in nature, or goes out of nature, is part of nature, or natural"—that, meaning the within and the without, includes the supernatural; and concedes the argument by confessing that something not in nature may come in, remain in, or go out. That nature arises out of, is sustained by, is interpenetrated in every part, and passes into the supernatural, is capable of proof. Every organism, whether animal or plant, possesses, besides the obviously useful arrangements of its organisation, other arrangements, the purpose of which it is utterly impossible to find out. Morphologists look upon the forms of animals and plants as something which cannot at all be

[1] "First Principles:" Herbert Spencer.

explained mechanically. Attempted explanations, by means of descent and modification, rest, for all their power and meaning, on a deep and far-reaching law, at present unknown. Go yet lower: the origin of every simple salt crystal, obtained by evaporating its mother liquid, is no less mysterious as to its first cause, and no less incomprehensible in itself than the most complex animal. When gold and silver crystallize in a cubical, bismuth and antimony in a hexagonal, iodine and sulphur in a rhombic form of crystal, the ultimate cause is in every case hidden from us. Resolve all the appearances, properties, and movements of things into manifestations of energy within space and time, then energy, space, time, pass all understanding. Even materially and mechanically regarded, our own beginning is unexplainable and full of mystery. The germ, in and with which we began to exist, was, like every other germ, without any discoverable difference; but, in the process of development, it acquired the differential characteristics of the sub-kingdoms; then successively the characteristics of its class, order, family, genus, species, race. Come to our own identity or personality, that of which every one is conscious, the most certain of all facts, even this is a thing which cannot truly be known—knowledge of it is forbidden by the very nature of thought. It is unwise, therefore, for atheistic physicists to try to erect so elaborate an argument, and such universal denial, on absolute nescience. They cease to be guides when they forsake their own line of things. If, knowing that matter and thought, even in their simplest elements, are incomprehensible—both ends being beyond mental grasp—they speak as if things were in their grasp and fully known, they are deceivers. A mechanical process does not explain all things; every explanation eventually leads to the inexplicable; the deepest truth that we can get at rests upon something which is infinitely beyond.

It is quite true, in one sense, physical science knows, or is destined to know everything, but, in another sense, it knows nothing. Ask the materialist, Whence came matter and energy? Who or what formed molecules? Who or what made them run into organic forms? He has no answer. "His mind may be compared to a musical instrument with a certain

range of notes, beyond which, in both directions, we have an infinitude of silence."[1] The same fact is put in other words,—"After all, what do we know of this terrible 'matter,' except as a name for the unknown and hypothetical states of our own consciousness."[2] We neither know nor can know anything of matter, save through the medium of our senses, and these senses rest upon our intellect, so that we only know matter by mind—the visible by the invisible. "The sciences have in this respect one common aim, to establish the supremacy of intelligence over the world;"[3] not the supremacy of the world over intelligence. Hence, so far from matter being the only thing we can know amongst the many unknown, and the only certainty amongst those which must for ever remain uncertain, it is, if not inferior in certainty, surely subordinate to that greater truth—the existence of mind. Whoever knows that matter and all its forms are shown to be the more marvellous, the more they are investigated, and, in their ultimate natures, absolutely incomprehensible, will know also that the attempted interpretation of all phenomena in terms of matter, motion, energy, is not merely an erroneous reduction of our complex symbols of thought to physical symbols, but an endeavour to explain our consciousness, or mental phenomena, by the matter and material phenomena of which we are conscious; as if a disquisition on a flower would explain the hand that grasps, the eye that sees, the intelligence that discerns. It is a presumptuous, ignorant attempt to bridge over that chasm between consciousness and physics, which must ever remain intellectually impassable.

It must strike even the most careless who realise the supremacy of mind that God, being the Creator of all things, the all things must include matter. (Col. i. 16.) The Bible does not tie us down to the fact that God did absolutely create matter; but we, believing that He did, that He brought it out of the invisible, seek to justify and verify our faith, for "every advance in our knowledge of the natural world will, if

[1] "Matter and Force:" Prof. Tyndall.

[2] "The Physical Basis of Life:" Prof. Huxley.

[3] "On the Relation of Natural Science to General Science:" Prof. Helmholtz.

directed by the spirit of true humility, and with a prayer for God's blessing, advance us in our knowledge of God, and prepare us to receive the revelation of His will with profounder reverence."[1] With reverence, therefore, we ask, nor can we help asking, "Whence, and to what end is this matter?" In the first page of Scripture, matter and spirit are placed in essential opposition. The space between the two is, indeed, no yawning gulf, but spanned by creative will when the visible comes forth from the invisible. Matter is substance in the lowest form, which every act of the Divine Spirit brings nearer to the final glorification.

We are told, however, that "the creation of matter is unthinkable, even as the annihilation of matter is unthinkable;" "there is neither more nor less matter in the universe now than there was in the beginning;" in fact, "as to matter, there cannot have been any beginning as there cannot be any ending." These assertions are nothing more than hypotheses. In the first place, that which is unthinkable cannot be so thought out as to become an unquestionable proposition of the highest certainty. In the second place, the capacity or incapacity of the human mind cannot, in any sense, measure or set boundaries to Divine action. In the third place, the existence of matter is as inconceivable as its non-existence; we only know of matter by energy, and of energy by consciousness, and of consciousness as a sign of the Unknown behind it. This Unknown makes our consciousness aware that it is abstractedly possible for energy to compress matter to such an extent as to be without limit; and thus, as the space occupied is indefinitely decreased, and the space unoccupied indefinitely increased, even though we may not be able to conceive matter reduced to nothing, we can and do get an approximate conception; and we get no more than an approximate conception even of those things which we pretend to know fully. To say that creation of matter out of nothing is unthinkable is merely this—that we don't know how to do it, nor how anyone else can do it.

Matter is in the world, and the pious mind conceives it came there because the Supreme Mind so willed. Socrates

[1] Sir Robert Inglis, British Association, 1847.

said that he was in prison of his own will awaiting death, but his muscles and bones of their own will would have gone off to Megara or to Bœotia,—"By the dog of Egypt they would, if they had been guided by their own ideas, and if I had not chosen as the better and nobler part, instead of playing truant and running away, to undergo any punishment which the State inflicts."[1] The mind of Socrates willed his body into the prison-house. Divine energy brought matter into existence to be, in its manifold shapes, the visible outer-works of an invisible universe.

Transitions and transformations from these two worlds are constantly in progress. The ultimate particles of matter are, therefore, permeable and permeated by the invisible and immaterial, so that the material world points to that certainty towards which all intelligence tends, and we arrive at the fact—long declared by Scripture and now proclaimed by science—that through all agencies works the Unknown Cause.

Natural phenomena are consequently physical signals of an ever-present energy, and afford analogies whereby we rise to the conception, at least in some degree, of existences absolutely immaterial and spiritual. It may be asserted, "We cannot argue from one state to the other," nevertheless, the connection between mind and matter is intimate, and our consciousness of identity, linking the invisible with the visible, the past with the present, forms a sound basis for argument. We are unable to attain the principle containing in itself, but not identical with all the various complicated conditions which evolve the seen from the unseen; but may represent them, not by that simplicity of motion once considered to be possessed by the planets in their repeated circular motion, but by those now known curves of complicity wherein all the various motions are contained, consequent on the unsymmetrical distribution of forces around the planetary bodies. As a matter of fact, we are acquainted in the visible world with the transfer of one grade of being to another, can conceive of a translation from some other state to this, from this to some state connected with it. We can imagine the change of visible or invisible energy into heat, some potential,

[1] "Plato:" Dr Jowett's Translation.

some kinetic, then build up the natural conception by a notion of gas or vapour indefinitely diffused, condensing either by contraction or by diminution of heat, until a liquid is formed, then regard the process as visible by which a liquid passes into a solid. In this way a scientifically exercised imagination obtains a view of the passage of things from the unseen to the seen, and how the operation of energy in and upon the matter of the universe produces those infinite varieties of existence which adorn and enrich the visible dominions of God.

The same fact as to spirit and matter may be otherwise thought of, seeing that different orders of being pervade the grosser and more material; that all kinds of attractions and affinities exist where none could be expected; that mind, incorporate with matter, acts upon it and is reacted upon; that the partitions between the visible and invisible are pierced, so that human intelligence permeates from one to the other; and as it is an unworthy imagination that infinite space contains nothing but matter infinitesimal in comparison, we arrive at the conception that not only human but other finite intelligences may pass and repass as the Supreme Intelligence arranges. The conception is scientific, not superstitious. Such passage from the unseen to the seen, from the immaterial to the material, is in perfect agreement with the existing arrangement of worlds, and to such an extent, that the actions and passings of electricity, magnetism and light out of invisible state and place into perceptible condition, are a material analogue of spiritual migration and mutation.

We may have a sort of embodiment as to this by experiment. Take a glass tube, 3 feet long by 3 inches wide, perfectly cleanse it, and follow the example of Professor Tyndall in his experiments on light. Roll a small bit of bibulous paper into a pellet not a fourth of the size of a small pea, moisten it with a liquid of higher boiling point than water. Hold the pellet in your fingers till it is almost dry, then place it in a small pipe serving for the introduction of gas into the main tube, and allow dry air to pass over it into this tube. The air charged with the modicum of vapour thus taken up will, when subjected to the action of light, begin immediately to form a blue actinic cloud, and in five minutes the

blue colour will extend quite through the tube. At the end of fifteen minutes the blue becomes a dense white cloud filling the tube.

Nor is that all; take away the pellet, empty the tube, sweep it by passing a current of dry air through it, and fill it again with the vapour of hydrochloric acid. Now, though the amount of "light generating matter" is almost infinitesimal, yet, when the electric lamp pours light through the tube, in one minute a faint cloud shows itself, grows in beauty, and in fifteen minutes the body of light is astounding.

When we think of the small amount of vapour carried in by the air at the first experiment, the appearance of a cloud so massive and luminous seems like the creation of a world out of nothing, and is, at least we may think so, a beautiful example of the material texture out of which was framed the visible world by Invisible Mind. As to the second experiment, our own intelligence directing the light that reveals existence of which we were before unconscious, not only yields an example of a passage from the unseen to the seen, but affords a symbol of the passing and repassing of those mysterious influences, under guidance of the Eternal, which are so active in the existing arrangement of worlds.

It is agreeable to every faculty of our mental and physical powers, that we should thus seek to view the mysterious passage from one state of things to another, the connection of former states with our present existence, and ascertain whether our faculties are at the end of the series. They are not at the end; every physical experiment, and every mental inquiry, prove that we are only beginning to know. Our sense of Divinity has feeling rather than knowledge for its basis. We are on the threshold of creation, in the childhood of intellectual and spiritual life; nevertheless, even now, "the soul," says Francis Newman, "is that side of our nature which is in relation with the Infinite; therefore, we are the amalgam of two substances;" or, as Isaac Taylor states, "a mean, essentially unlike what could have resulted from any possible construction of one by itself;" and, by this compounding of mind with matter, we control both, and acquire

the power to conquer and possess new worlds, to pass from sonship as to man unto sonship as to God.

"The wind, before it woos the harp,
Is but the wild and tuneless air;
Yet, as it passès through the chords,
Changes to music rare."

There are those who think that science can neither contradict nor affirm what is taught by Scripture as to the beginning of things, and of creation; and as "it is unworthy timidity in the lover of Scripture to fear contradiction, so it is ungrounded presumption to look for a confirmation in such cases;[1] but as science is undoubtedly able, with some accuracy, to retrace the past, when the earth was not, no religious man should stand outside while she reverently uncovers the inner works and mysteries of the world. Such revelation as to the works is worthy of all acceptation for enlightenment as to the words. "So far as we can judge, no one will demonstrate what was the primitive state from which the progressive course of the earth took its origin. . . . We cannot, in any of the palæontological sciences, ascend to a beginning which is of the same nature as the existing course of events, and which depends upon causes that are still in operation. Philosophers never have demonstrated, and probably never will be able to demonstrate, what was the original condition of the solar system, of the earth, of the vegetable and animal worlds, of languages, of arts."[2] Despite all this, it is possible to obtain knowledge of past creations; for we detect processes of aggregation which are even now building up new worlds. Processes "leading, according to the position and perhaps the character of the masses acted upon, to the formation of suns of greater or less splendour and magnitude, of streams and clusters of small stars, and of systems in which suns and stellar streams and clusters seem to be intermingled."[3] There are waning worlds and waxing worlds at the present moment, dried up as the moon, fertile as the earth, semi-fluid as Saturn, or cloud form as Nebulæ. They lie between the ruins of worlds that

[1] "Philosophy of the Inductive Sciences," vol. i., p. 688: Wm. Whewell, D.D.
[2] "Philosophy of the Inductive Sciences," vol. i., p. 688: Wm. Whewell, D.D.
[3] Richard A. Proctor.

have been, and the chaotic materials of worlds which shall be. In spite of wear and tear, worlds are extending their sway, and cosmos is conquering chaos. Thus science gives definiteness to our conceptions of creation, confirms or annuls those conceptions. We no longer look at the earth as a savage regards a steamship,—a something wholly beyond comprehension. The entire process is one of energy, but not of energy only. The external world, so far as we see the phenomena and their characteristics, is unquestionably the result of intelligent action; while the inner world, as seen in the instinct of animals, and in the morals, religion and intellect of man, has a voluntary capability of turning natural processes into other uses, of arraying energy against energy, and reducing nature to such obedience that the wind blows for us, fire burns for us, water becomes a mighty servant, and the electric fluid is our swift messenger.

Test, by means of one word, "Beginning," whether our knowledge of God's work does not enlarge and confirm our view of truth in God's Word. What does Beginning mean? It means the origination of things. "In the beginning God created the heaven and the earth." Until of late many of us had taken "beginning" to imply a comparatively modern time; but, in truth, time has no connection with it, except in meaning that before time was, when the Word was with God and was God, in that eternity, when the Son was, then were the worlds created. In that beginning, when the Son was with God, God, the Son, created all things. Now, God is eternally all that He is; there is nothing new, nothing by chance nor of caprice. If He is Creator, He is eternally Creator; for the power, the wisdom, the love are eternal; and the act of Creation, proceeding from them, must of necessity be eternal, though not eternally creating, or we impose on the Creator the conditions of time, and subject Him to the vicissitudes of the future.

We are not responsible for the difficulty growing out of this, and the difficulty seems—God has eternally created, but the creation had origin, and that origin gave birth to time. The difficulty really lies in the inadequacy of language to express, and the imperfection of our understanding to know, Divine

things. It is certain that no number of creatures, vast as that number may be, no extension of space or ages, however grand that extension, can express the eternity and infinity of the Creator. We must, willing or unwilling, admit that to our consciousness, all duration is comprised within two series, a series of past infinite moments, and a series of future infinite moments; we add these together, and they form relatively, eternity; but absolutely, time; one series is behind, another is before. As for God, to whom nothing is past or future, the two series exist under the same title, the one and the other are contained in the Now or Eternity of the Eternal. It may seem as if the idea of a created world, without commencement in time, and without limit in space, is one of those infinities which cannot be explained; in that case it is the best possible example of the Infinity and Eternity of the Creator (Gen. i. 1; John i. 1-3).

Creation, to express the eternity, the infinity, the majesty, the wisdom, all the perfections of God, ought to extend to an eternity of ages, to an infinity of spaces, to an innumerable variety of existences in every degree, all finite in themselves, but, in space beyond space, and world beyond world, a symbol of Infinity; the absolute Infinity being figured by an infinity that is relative. The relative being duration, and extent without bounds, only contained by eternity and infinite space. Is not this pantheism? No; the Creator alone is absolutely eternal and infinite; but the creation, occupying all space and all time, subject to division and limit, does, in those innumerable divisions and exhaustless limits, represent to the utmost possible extent the operations of God. To obtain even a faint conception of this, we must deepen our notions both of eternity and time. Time is the law of everything that changes; Eternity is the incommunicable and unchangeable attribute of God. Plato says:—"Time is a movable image of immovable eternity." We cannot say there was a time when no time was; yet, as time was created, and the world was fashioned, we ought to say,—"There was no time without creation, the successive movements of which form time; therefore, time and creation have always been; nevertheless, they were created, and are not co-eternal with God;" for,

as St Augustine said—"He was before them, although He may never have been without them; because He did not precede them by an interval of time, but by immovable eternity." In this sense, God, as eternal Creator, is eternal Saviour.

Reasonings of this kind, illustrative of our feebleness, and of the vast meaning contained in so many texts of Scripture (2 Chron. vi. 18; Job xi. 7, 8; Isaiah lxvi. 1; Col. i. 15-17) formerly seemed visionary, but are highly useful as proof that the utmost exercise of all our powers enables us to take only a few steps within the threshold of creation. The telescope has manifested the world to be infinitely vast, and the microscope has revealed worlds within worlds, infinitely small. Moreover, Divine attributes are not like the faculties or impulses of a human nature, separate and distinct qualities or powers, God is One. He is in every place, but the presence is incomprehensible. He is not here or there as a property or extension. His relation to place, time, and extension is peculiar to infinitude. Divine power is never put forth unaccompanied by Divine wisdom, nor apart from goodness and justice. No attribute is ever latent; for there is no parting nor divisibility in the Divine essence. His plan of the world, everlastingly present with him, had temporal realisation in that effectual interference by which the material universe became a segment of the infinity in which it was developed. There was first a direct personal self-operation, a putting forth of Divine energy, and, afterwards, the use of all natural means, so soon as they were called into existence. The action continues in that spontaneousness of nature by which she seems to do all things as of herself. The worldly structure rises storey above storey, nor are the chambers of uniform dimensions, embellishment, and furniture. We look through some of the courts, behold, from a distance, a thousand halls, grand and beautiful; and we take all this as a gauge of some vast, wonderful, and mysterious life, and the visible universe as a tent of sojourning for wayfarers to the eternal future.

Pass from argument to figure—God called a man from dreams into the vestibule of heaven, "Come thou hither,

and see the glory of My house;" and to the angels round His throne, He said, "Take him, strip off his robes of flesh, cleanse his vision, put a new breath into his nostrils, but touch not with any change his human heart—the heart that weeps and trembles." It was done; and with a mighty angel as guide, the man stood ready for an infinite voyage. They launched without sound or farewell from the terraces of heaven, and wheeled away into endless space. Sometimes with the solemn flight of angel-wings, they passed through Saharas of darkness, through wildernesses of death, separating worlds of life. Sometimes they swept over frontiers quickening under prophetic motions from God. Then from a distance, measured only in heaven, light dawned through shapeless film, and in unspeakable space swept to them, and they with unspeakable pace to the light. In a moment the rushing of planets was upon them—in a moment the blazing of suns around them. Then came eternities of twilight, that revealed, but were not revealed. On the right hand and on the left, mighty constellations built up triumphal gates, whose architraves, whose archways, seemed ghostly from infinitude. Without measure were the architraves, past number were the archways, beyond memory the gates. Within were stairs that scaled eternities around, above was below, and below was above, to the man stripped of gravitating body. Depth was transcended by height insurmountable, height was swallowed up in depth unfathomable. Suddenly as thus they rode from infinite to infinite; suddenly as thus they tilted over abyssmal worlds; a mighty cry arose that systems more mysterious, worlds more billowy, other heights and other depths were coming, were nearing, were at hand. Then the man sighed and stopped, shuddered and wept. His over-laden heart poured itself forth in tears, and he said, "Angel, I will go no further, for the spirit of man acheth with this infinity. Insufferable is the glory of God. Let me lie down in the grave, and hide me from oppression of the Infinite, for end I see there is none." Then from all the listening stars that shone around issued a choral voice—"The man speaks truly—end there is none." The angel solemnly demanded—"end there is none? Is there indeed

no end? Is this the sorrow that kills you?" But no voice answered, that he himself might answer. Then the angel threw up his glorious hands towards the Heaven of heavens, and said, "To the universe of God there is no end, lo! also, there is no beginning."[1]

[1] Altered from De Quincey's Translation from the German of Jean Paul Richter.

STUDY IV.

RUDIMENTS OF THE WORLD.

"The world is not God, as the Pantheists affirm. It did not exist from eternity as the Peripatetics taught. It was not made by Fate and Necessity, as the Stoics said. It did not arise from a fortuitous concourse of atoms, as the Epicureans asserted, nor from the antagonism of two rival powers, as the Persians and Manicheans affirmed, nor was it made by angels, or by emanations of æons, as some of the ancient Gnostics held, nor out of matter co-eternal with God, as Hermogenes said, nor by the spontaneous energy and evolution of self-developing powers, as some have affirmed in later days, but it was created by One, Almighty, Eternal, Wise, and Good Being—God."

NEWTON'S *Principia*.

WHAT is, or was, the Primeval Matter?

Possibly something out of which all the varieties of matter have been formed. Something simpler than that which is now called elementary matter. The elements, now numbered sixty-four, owe their distinctive properties to the grouping of certain ultimate atoms, possibly not of one kind, but of several kinds; for there are elements which appear to be so related, as to have community of origin. If they were simple homogeneous masses, it is thought that their incandescent vapour would show in the spectrum one single bright line; but there is no substance known the spectrum of which has only one line. The flame of hydrogen, the lowest in the scale, has four spectral lines, made up, it is supposed, of four different sorts of matter; but no conclusion regarding the complexity of hydrogen can be come to by means of the lines. The thickness of the spectral lines depends on their relation to the spectrum, whether toward the violet or the red ends. Some lines depend probably on the normal vibrations of matter, and the other on the harmonic vibration.

No force, known to us, can separate the constitutional

atoms of the elements; or effect any change in them; but if what is thought of Sirius and Aldebaran be true, that they are younger and hotter suns than our own, there the various kinds of matter may possibly exist in simpler form. Sirius contains hydrogen, but the proportion of metallic vapours is small in its chromosphere, and the hydrogen lines are enormously distended. The discovery of silicon in a new form, in the meteorites, renders possible the compound nature of that so-called element; and there is evidence of the compound nature of calcium in the Sun.

We are told—"by the different grouping of units, and by the combination of the unlike groups, each with its own kind, and each with other kinds, it is supposed that there have been produced the kinds of matter we call elementary."[1] If we accept this statement, it must be against all logic and experience. Units possessing precisely the same properties, or rather no properties; and, by energy acting in a straight line, striking against one another; then going off in another direction; till, again striking, they go off in a third direction, and so on; will forever remain the same units and the same energy—neither creating new matter nor new energy. If, moreover, we bear in mind the all-important principle, that "nothing can be learned as to the physical world save by observation and experiment, or by mathematical deductions from data so obtained," we shall guard against those empirics who, reducing all existence to one element—destitute of all properties, and to one energy—acting only in a straight line, do then, to suit their theory, take in all that they have thrust out, and endue this one supposed form of matter with the mysterious faculties and occult powers of all terrestrial life.

Consider now the nature and constitution of matter.

If with Newton we speak of dense invisible units, those are only symbolic, yet still they seem verified in chemical experiments which manifest particles of specific weight and size. Get rid of the atom, as Boscovich does, substitute mere geometrical points, points without dimensions, as centres of force which attract and repel each other in such wise as to be kept apart and at specific distances; behaving, so far as external

[1] "Principles of Psychology," vol i., p. 155 : Mr Herbert Spencer.

bodies are concerned, just as an atom would. Pass on with Sir William Thomson and Helmholtz, to the vortex-atom theory, that matter consists of rotating portions of a something which fills the whole of space, that is vortex-motion of an everywhere present fluid. Add to this, every so-called atom of any one substance, wheresoever we find it, on the earth, in the Sun, or coming to us from cosmical spaces, possesses precisely the same physical properties. Then take a drop of water, and by means of a galvanic battery decompose it into the constituent gases; this shows that the parts may be separated until they are so small, that if again divided, the halves or parts are no longer similar to one another; but one is oxygen, the other is hydrogen. Thus we have arrived at the grained structure of the whole.

How finely grained water is, may be seen from the fact, that were it possible to draw out a film 100,000,000th of an inch in thickness, it would probably still contain a few particles of water in its thickness.[1] As to the ultimate particles of the elements, by a rough process, Cauchy obtained the 400,000,000th part of an inch as their diameter. By a calculation upon what is called the electricity of contact of different metals, it is thought to have been ascertained that the grained structure must exceed the 700,000,000th part of an inch. By the molecular motion of gases, a result has been obtained that the 500,000,000th part of an inch is the size of the particles. These points or atoms manifest powers of attraction and repulsion; march under three banners as gases, fluids, solids; but, it is probable that every one is capable of existing in all three forms. The mysterious complexity of their nature may be inferred from gases. The result arrived at by several inquirers as to the molecular motion of gases is, that the average distance between the several particles of a gas at the ordinary temperature and pressure of the air, must be something between the 6,000,000th part of an inch, and the 10,000,000th part of an inch."[2] The number of particles in a cubic inch of air is, approximately, about the number 3 with twenty cyphers after it; and as a large plum is to the whole earth,

[1] "Recent Advances in Physical Science," p. 311: P. G. Tait, M.A.

[2] "Recent Advances in Physical Science," p. 315: P. G. Tait, M.A.

so is a particle of water to the whole drop ; there being in that drop about 10^{26}, that is, 100,000,000,000,000,000,000,000,000. The particles of a gas are known to be free, detached from one another, and constantly flying about in all directions. The velocity of particles of hydrogen, according to Foulis' experiments, must be about 6055 feet per second at 0 C. This is a higher velocity than has ever been attained by a cannon ball. Clerk Maxwell and Boltzman have ascertained that in a mass of hydrogen at ordinary temperature and pressure, every particle, on an average, has 17,700,000,000 collisions per second with other particles; that is to say, in every second its course is changed 17,700,000,000 times ; and, yet, the particles are moving at the rate of 70 miles the minute. When rude voices say, "The Lord never passeth by ; not in the wind, not in the earthquake, not in the still small voice ;" we cannot but marvel that some cunning creatures are so savage as not to perceive God unless He thunders on them.

If we look at Nature in her working dress, we find that the elements are not apparently of the same relative use and importance. It is a startling fact that the variety of existences which Nature contains, far from exhausting all the forms and combinations of which the elements are capable, only uses a few. The solid globe, whithersoever our search extends, is composed of say—silicon, aluminium, iron, magnesium, sodium, potassium, and oxygen. The broad ocean composes its vast masses of fluid principally from two elements—oxygen and hydrogen,—and the salt consists mainly of chlorine, sodium, and oxygen. The animal and vegetable worlds, innumerable in forms and functions of life, are chiefly built of carbon, nitrogen, hydrogen, and oxygen. It is, indeed, astonishing that the great variety exhibited in the whole world is unfolded out of few materials. The Creator has taken but a handful of elements wherewith to form, in the main, the gorgeous structure of our dwelling. Do we ask why ? The answer comes—as yet the world, to us at least, is rudimentary. Eternity and space contain endless surprises and possibilities ; we know not what we shall be. There are latent forces of development which, when called forth, will exhibit new and exquisite powers. The elements, now

little used, may hereafter display magnificent variety and surpassing beauty. The great Master has wrought charming music with few notes; what soul-stirring melodies will awake gladness when all the chords are touched!

Now listen to the life-throb of our universe. By scientific use of our imagination, we may conceive all the mechanical, chemical, and vital operations of the world as resulting from an infinite congeries of invisible atoms or mathematical points of attraction and repulsion. These countless centres are so many starting points of motion, causing atoms to cluster into molecules, and molecules into masses. In other words: "Atoms and molecules are little magnets with mutually attractive and mutually repellent poles. The attracting poles unite, the repelling poles retreat; and vegetable, as well as mineral forms, are the final expression of this complicated molecular action."[1] This life-throb of the whole visible and palpable world is a pulsation going forth every instant from the Eternal Energy, and bringing out from the invisible and intangible that which is visible and tangible.

To develop the visible from the invisible, there must be a passage from the one to the other, or an ethereal medium, a stage in which the energy had passed from one and had not arrived at the other. Further, if we assume that all energies are reducible to One Energy, and that all forms of matter are derived from one primeval substance, it is demonstrably impossible for variety ever to have unfolded itself from this primitive physical unity. The change must have come from without, and even allowing that the change can be mechanically formulated, we must recognise in it the Unknown Energy. The variety called Nature did not evolve itself from unity, neither does Nature of itself guide or maintain the existing variety of continual change. Organic energy does not seem to be interchangeable with mechanical. No physical force that we know of can be converted into that which is called vital energy; least of all can it be counted as the correlative of mental change. Again and again there have been intrusions of new things. If chemical action differs from mechanical; if life is not chemistry, and

[1] "Matter and Force," Professor Tyndall.

certainly it is unknown in our laboratories; and if mind is not matter; certainly many and great are the changes that have been wrought by new orders of energy.

View the whole from another standpoint, from the brow of a hill when all is still, the breeze having died away. The air is clear, and we listen in vain to catch a sound other than the low murmur of waves breaking on the shore. The shepherd's flock slumbers beneath the elm-tree shadows, and cattle stand in shady hollows by the river-side. The green meadows, fresh and luxuriant, seem also asleep, and all nature is in repose. Is it indeed so? Come again, even after a little time, and a change has been wrought. Even the flowers which bedeck the soil, the very substance of those hills standing so firm, the deep sea so placid, the quiet still air, are all in motion. From year to year the lime-stone of the rock changes its hard lineaments; the elastic sod, pressed by our feet, is not the same, its materials are being altered, carried away and renewed; changeable the wind, so the sea; all things are working together, and that for ever, in vast numberless complications, every one the child and parent of other. The Guide and Ruler of this progress setting a limit to the destructive and wearing-down processes, the Restorer of our globe in its features of beautiful fabric, is not nature itself but the Eternal, of whom every phenomenon is a manifestation, and of whom beauty and brightness are the features. The contemplative mind beholds every day the passage of things invisible into sight, the transfer of the seen into the unseen, and all is natural. The passing away of the world might be called not so much an act of violence, as a pause, and the annihilation of solid spheres rather a rest than the crash of destruction. We reverently lay all our science at the feet of the Eternal. He the Absolute, before and within, beyond and above the universe, gathers the links of an endless chain of conditioned existence from the depths of His Own intelligent and developing power.

"Oh purify my eyes,
More and yet more, by love and holy thought,
Thy presence, Holiest One, to recognise."

The theory which reduces the universe to mere atoms,

energy, and empty space, and thence deduces the whole series of phenomena, encounters an obstacle at the outset: atoms seem absolutely unchangeable. The monistic doctrine of homogeneous atoms will not work, and many atoms of many kinds explain no property of body which has not been previously attributed to the atoms themselves. Pulverising the world into particles, next to nothing, in order to hit upon something just beyond, is a hopeless task; and to imagine that out of the superlatively little may be drawn the secret of the world's power and constructive skill, is a strange delusion. Starve the atom as you will, and then make a miniature of it in your thought; but having dropped the attributes, how can you pick them up again? Make its essence to be extension or palpableness, or merge it into dynamic points, unextended centres of attraction and repulsion, you cannot get to the full end, nor arrive at the beginning of things. The final simplicity of the atom must include internal movements; when these are sufficiently excited, rays are emitted of a length which is in measure of the time of vibration of the molecule. This change of form, and these internal movements, are impossible without shifting parts and altered relations, but then your atom is a wonderful whole, made up of many parts. The atomic theory is no explanation of the creative mystery: the mystery remains.

Reverse the process:—The eye of modern science seeks, but findeth not, some original undivided stuff as the continuous substratum of all forms and distinctions. We cannot get beyond an infinitude of discrete atoms, which, though conformed with precision to a constant type, have different internal vibrations, are agitated by movements carrying them in all directions, and form the myriad types with which is printed the Book of Nature. By means of these elements we produce, without any change in kind or proportion, substances with marked differences of physical and chemical property. Several distinct compounds are formed out of the same relative weights of carbon and hydrogen. Simple carbon appears as charcoal and the diamond. Apparently trivial changes in atomic conditions effect changes of the most unexpected and startling order. Phosphorus is, in the

yellow semi-transparent form, highly inflammable. White phosphorus, formed by exposure under water to light, is less combustible. Black phosphorus is obtained by sudden cooling of melted phosphorus. Red phosphorus can be prepared in various ways, and is combustible only at a high temperature. If we attribute these differences to various grouping of the atoms, and say, "Whatever their form, it is easy, within certain limits, to vary in imagination the adjustment of their homogeneous sides, so as to build molecules of several types, and ultimately aggregates of contrasted qualities;" then, in the ultimate stuff of the universe, there are not only myriad types, but myriad types of the same letter. Nor is this all; every one of these letters has its own select list of companions and peculiar terms of fellowship. The hydrogen atom vainly tries in levity, with low figure and light weight, to be intimate with the oxygen element. The reply is, "None of you, or two of you;" and so, throughout, there are certain mathematical proportions. One gas unites with one, two, three, or more volumes of another. There appear even to be special conditions for the likeness "of daisy to daisy, of bee to bee." Then, lest we imagine everything is known, we find that while the same substance is always made up of the same elements, in the same proportion, nevertheless the same elements, in the same proportion, do not always form the same substance: a paradox, yet strictly true. These things forcibly illustrate the omnipresence of mystery. We find, beneath every physical problem, a metaphysical problem, whereof no human cunning can detect the solution.

Now view the printing of the Book.

The ultimate particles of matter cluster into molecules, then into masses, not trying or experimenting to obtain different grouping, or to combine unlike groups, but every one taking its own invariable form. For example, water, wherever and however formed, is always the same substance, and made up of the same component gases in the same relative proportions.

"No theory of evolution can be formed to account for the similarity of the molecules throughout the whole region of the stellar universe, for evolution continuously implies continuous

change, and the molecule is incapable of change or decay, of generation or destruction. . . . Though, in the course of ages, catastrophes have occurred and may yet occur in the heavens, though ancient systems may be dissolved and new systems evolved out of their ruins, the molecules out of which these systems are built—the foundation stones of the material universe—remain unbroken and unworn."[1] They are endowed with attractive and repellent poles, whose play produces definite forms of crystalline architecture of constant similarity, yet endless diversities, through various and strong interactions.

Every solid body, when slowly deposited from an aeriform or a liquid condition, takes a definite symmetrical shape, which we call crystal — the process we call crystallization. "All crystals, without exception, are solids bounded by plane faces symmetrically disposed about certain straight lines called axes. No mathematician could determine these axes with more accuracy than they are found to exist. Numerical relations of the most remarkable kind exist in the proportions in which alone natural substances will combine, and these numerical relations exist also in plants. . . . Nothing is more striking in botany than the mode in which certain numbers, such as three and five and their multiples, prevail. . . . Can we believe them to be exhibited in nature by a mere concourse of atoms, or by self-existing and self-created proportions of matter without the intervention of Intelligence and Mind?"[2] Little importance attaches to that unphilosophical theory which assumes that chance, having an eternity wherein to try and fit and combine, did, at length, by a chance arrangement, form the worlds; and, by chance, continued them. Cicero had a word on this—"The man who believes this (that the world with all its beauty, with all its fittedness for man, as well as for animal and vegetable life, was made by the chance meeting of atoms) will believe that if a countless number of the letters of the alphabet—their material being either gold or anything else—were thrown in a mass in some place, from these letters

[1] Professor J. Clerk Maxwell.

[2] "On the Limits of Science:" Wm. Forsyth,—*Fraser's Mag.*, Feb. 1875.

shaken out on the ground, there can be formed the annals of Ennius, arranged in such order as to be read continuously."[1]

In every molecule, formed by combination of separate atoms, we have, as it were, a solar system. The atoms are not supposed to be indefinitely near one another, but of distances great in proportion as are the planets from the sun, and revolve round each other. The distance of a fixed star from us is very great compared with that of the sun, but a portion of matter which, in our most powerful microscope, seems almost indescribably small, may be as wonderfully complex in structure as is the star itself. The molecules build themselves up into definite shapes, but create neither new matter nor new energy; neither the vegetable body nor the animal body, as regards matter and energy, can create anything. All the mystical play of mechanical, chemical, and vital molecular processes leaves the magnitude of matter and the energies unenlarged. Nature, therefore, is not the equivalent of all phenomena; cannot create matter, nor originate energy; it is a something in relation to that which went before; a something in relation to that which will follow. Gravity or energy is not an essential of matter, but that by which it is pressed or pushed about. Hence, matter, in itself, whether ponderous as gold, or dense as steel, "subtile" and ethereal as gas or magnetic fluid, is not self-motive; yet we only know matter by its manifestation of energy, and "we are irresistibly compelled by the relativity of our thought to vaguely conceive some unknown force as the correlative of the known force."[2]

The operations of this energy are beautiful and delicate. From a solution of common salt, let the water slowly evaporate, and the minute particles of salt, so minute as to defy all microscopic power, deposit themselves; and, through the clustering of innumerable molecules, a fine crystalline mass of miniature pyramids is raised by structural energy. The ice of our winters is of equally skilled handiwork in definite shapes; precious to the eye of science as the diamond, and purely formed as they are delicately built. The cells of the

[1] "De Natura Deorum," ii. 37.
[2] "First Principles," p. 170: Herbert Spencer.

sheath of a straw, when examined by polarised light, are found to have the architecture of a crystal : the molecules are set in definite positions. The exquisite texture of light is a miracle of beauty in its gorgeous colours; a marvel in the invisible rays, which exceed in heat; a wonder of chymic power to the world in the ultra-violet rays; and a mystery, in making all other things to be seen: itself unseen. The atmosphere is not only diffused with subtile power, but containing carbonic acid—food for the vegetable world; and oxygen—the support of animal life. All these, whether waves of aether, or atoms coalescing in sky-matter, or matter in invisible masses, move to the music of law.

Pass from the rudiments to the mechanism of worlds.

Diffused matter is contracted into collections of attenuated flocculi, and solidified into masses. If we could mentally see the generation of the movement, the first operation of energy, we might expect, from what we know of things, a slight shiver as of leaves in faintest wind, a throb extending through the sphere of motion, and the whole showing a complication vaster than the mightiest ocean swell. We may conceive of this motion having a rhythm which could be traced in light, heat, electricity, in the spiral arrangements so general among the more diffused nebulæ, and in every particle of matter—rhythm prepared for by some primordial condition, and continued by persistence of energy. By contraction, the potential energy would be gradually transmitted into heat and visible motion.

Energy, carrying the moved body in the same straight line for ever, would cause an infinite space, void of everything except the moving body; or if centres of equivalent energy were placed at equal distances, they would remain in equilibrium for ever. How then are the vast curves of the planetary bodies obtained? To represent it mentally, fill an apparent vacuity with an æthereal medium—a species of matter—countless lines radiate from the centre to every side, and along every line this medium presents resistance, so that the exact line on which matter sets out, drawn by attraction to the centre, cannot be continued, but becomes a curve; and a curve the more complex in proportion as the energies are

more numerous and varied. Apply this to nebular condensation, and precipitation of diffused matter into flocculi of denser matter. As the matter moves by gravitational energy, the direction would be, first of all, in a straight line; but the direction being continually influenced by surrounding bodies, themselves in relative movement, rotation and revolution would then be set up, and conditions analogous to those of the sun and solar system be established. The sun, our earth, and the other planets had their own concentrations, say of nebulous ring, gaseous spheroid, liquid spheroid, and spheroid externally solidified. If we regard this energy as merely mechanical, it possesses nothing directive; no more produces a planet than a poem; neither explains the energy of gravity which brings all bodies together, nor that of repulsion which tears them asunder. The pressing and pushing about of matter are not the equivalents of all phenomena; but, as magnetism, heat, and light are held to be different modes of some one universal energy, we regard the attraction and repulsion of matter as manifestations of a mysterious Power, —a Power which, Herbert Spencer says, "transcends intuition and is beyond imagination."

Continue the mechanical investigation :—

1. *The Earth.*—The form of the earth is a spheroid or ellipsoid. It is thus accounted for. A detached fluid mass, if at rest in space would assume, by gravitation of its particles, the form of a sphere. When it began to rotate on its axis it would become flattened at the poles, and bulge at the equator. This bulge is now about 1 in 300, or something like 13 miles of extra matter all round. When separated and aggregated from the nebula which produced the solar system, our earth probably exceeded 40,000 miles in diameter, 60 times more than now, and then the mass took about 29½ days to rotate. The earth's oblateness is proof that it was modelled when in a yielding or plastic condition, before the crust had been formed, when it was an incandescent globe rolling through space, with all the water and other vapourisable matter in a gaseous state. Sir Isaac Newton calculated that "a comet formed of iron would absorb so much heat in its near approach to the sun as to require

5000 years to cool." The time required for the cooling of the earth from its molten condition to a habitable state would, according to Bischof's experiments on basalt, be 350,000,000 years. The computations vary from about 100,000,000 to about 1,000,000,000 years. The waters having attained a state fit for the support of life the vital period began, and it is calculated from the rise of temperature (taken over the whole earth's surface), at an average of 1 degree for 100 feet of descent, that about 10,000,000 years ago the surface of the earth had just consolidated, or was about to consolidate, and that, in some thousands of years after that, the heat "would not interfere very greatly with the growth of vegetables; so from this point of view we are led to a limit of something like 10,000,000 of years as the utmost we can give to geologists for their speculations as to the history even of their lowest order of fossils."[1]

2. *The Planetary System.*—Not only are the planets shaped like the earth, they move in the same direction round the sun, and in nearly the same plane, with rotation in the same direction as their orbital motion. The orbits, both of planets and satellites, nearly coincide, and differ but little from circles. These peculiarities are considered to be remaining indications of a previous state, in which the whole planetary system formed one connected mass, with uniform rotatory motion, and support the hypothesis that the star system was formed out of a nebulous mass by the mutual attractions of its parts. Every one, star and sun, in his own order receiving definite form, size and function to become a dwelling place for life; or, in some other way equally good, to show forth the glory of God. Our own system, according to Sir William Herschel, might "be said to be one that has fewer marks of profound antiquity on it than the rest." Sir W. Herschel stated in the same paper, 1785,—"Our system, after numbers of ages, may very possibly become divided, so as to give rise to a stratum of two or three hundred nebulæ, for it would not be difficult to point to so many beginnings or gathering clusters in it."

3. *The Connected Mass.*—The nebulous mass, out of which our system was formed, not only filled all the space now

[1] "Recent Advances in Physical Science," p. 167: P. G. Tait, M. A.

occupied by the system, but extended vastly further than the limits of the most distant planet. Comets, crowds of shooting stars, and the zodiacal light exhibit traces of dispersed matter such as existed in that old condition; matter, scattered as powder, but moving, and ignited like those nebulous patches which now shine in the far off regions of the firmament.

Now observe two facts,—1, A large amount of light and heat sent out into space returns not again; so that the sun and stars are cooling. 2, The visible motion of bodies in space is being gradually stopped by æthereal friction. A great part of the original mechanical force has already been converted into heat and dissipated, and, as to the stoppage of visible motion, every tide on the earth and every day's march through space bring us nearer to the end, not of our system only, but of all systems. The sun is hastening to his destiny, to that gathering of matter into one universal centre, that equilibrium in which, motion ceasing, there will be no light, no warmth, no life. The life of man, the existence of our sun and planets, are but as a ripple on the bosom of the eternal deep.

Work this out more definitely. The chief part of the primordial energy now belonging to our system is in the form of solar heat. This energy will not remain ours for ever; portions are continually radiating from it into infinite space.[1] "The sun is so much colder that we may have our fires; he is also so much colder that we may have our horse-racing and our Alpine climbing. It is, for example, certain that the sun has been chilled to an extent capable of being accurately expressed in numbers, in order to furnish the power which lifted this year a certain number of tourists from the Vale of Chamouni to the summit of Mount Blanc."[2] We calculate that only the 454th part of the original mechanical force which worked the condensation of our system remains, the other has been converted into heat; every tide, though with incalculable slowness, diminishes the mechanical force of the earth; and our store of heat, though sufficient for an immeasurable time, is lessened by daily scattering into space. These are not lost as to the universe, but whither they go and into what they are formed

[1] "Aim and Progress of Physical Science:" Prof. Helmholtz.
[2] "Vitality:" Prof. Tyndall.

no man knoweth. Despite this scattering, the earth's temperature during the historic 4000 years has not sensibly diminished, and a sufficient quantity of heat for the total emission of 2100 years would be generated by the combustion of only 1-10,000th part of the sun's diameter. So small a change our closest astronomical observations would hardly detect. The store of energy we possess is indeed immensely great, and the incessant emission of light and heat during the period of human history has not sensibly decreased it, still, the inexorable laws of mechanics indicate that it must finally be exhausted. If the universe is delivered up, as physicists say, to the undisturbed action of physical processes, all energy will pass into the form of heat, and all heat passing, by radiation and conduction, from the warmer bodies into bodies less warm an equilibrium of temperature will be established. From that time evermore the sun will have neither light nor heat; the universe will rest, the earth be dead. Our race may have a long, not an endless existence. Ere the end, thus delineated by science, Scripture declares that there will be a crisis—a judgment—the time of which is mercifully hidden.

The common method of measuring geological time is, by some, considered tobe unreliable, because the thickness of stratified rocks belonging to any period is no indication as to length of time. Ten thousand feet may, under certain circumstances, be formed in as many years; but, in other conditions, require as many centuries. Palæontology may be accounted still worse as a guide, for species do not change at anything like a uniform rate. If, however, the great variations of climate are the result of changes in the eccentricity of the earth's orbit, we have a means, but still open to doubt, of calculating when those variations occurred. According to the formula of M. Leverrier, there are three chief periods of high eccentricity, with a few subordinate maxima between them. About 2,650,000 years back the eccentricity was inferior. It then began to increase, and 50,000 years after, namely 2,600,000 years ago, it attained ·0660; 50,000 years after that it diminished to ·0167, about its present value. It then began to increase, and in another 50,000 years, or 2,500,000 years ago, it approached almost the superior limit of ·0721. Then

diminishing, at 2,450,000 years ago, it was ·250. These two maxima, separated by a minimum and a period of 200,000 years form the first great period of eccentricity. Passing on more than a million and a-half years, there is the second great period of three maxima, separated by two minima. The first maximum 950,000 years ago, the second at 850,000 years ago, the third at 750,000 years ago—the whole occupying nearly 300,000 years. Passing on another million and a-half years, that is, to a time about 800,000 years in the future, we come to the third great period of three maxima, at periods of 800,000, at 900,000, and 1,000,000 years to come, which are separated also by two minima. These three great periods, two past and one future, are separated from one another by about 1,700,000 years; and seven times in the whole period the earth's orbit is nearly circular, four in the past and three in the future.

Unless the physical principles on which these eccentricities were calculated are erroneous, climate must have been greatly affected. For example, 850,000 years ago the heat of the sun at midwinter was 837 instead of 1000 as at present. Whether this value be a little too high or too low the effect on temperature must have been considerable. The glacial epoch, which so greatly troubles geologists, is not that extending from about 980,000 to about 720,000 years ago; but the one beginning about 240,000 ago, and extending to about 80,000 years ago. The whole question is well argued in Mr Croll's book, "Climate and Time," p. 311-328; and he considers the facts of geology to be consistent with the glacial epoch not dating back beyond 80,000 years. Reasoning after his manner, it may be inferred that the mean thickness of stratified rocks has been greatly over-stated. Their maximum thickness of 72,000 feet in Great Britain must not be taken for their mean thickness. "Had the materials been spread over the entire ocean bed, the formation would have had a mean thickness of little more than 200 feet; and spread over the entire surface of the globe would form a stratum of scarcely 150 feet in thickness."[1]

A change in the obliquity of the ecliptic would alter the level of the sea. As to the last elevation, it seems

[1] "Climate and Time," p. 366: James Croll.

almost certain that 11,700 years ago the general sea level on the northern hemisphere was higher than at present, that was the period of the 25 foot beach; and 60,000 years, the age of the 40-foot beach.[1]

The alternate warm and cold periods, in north and south, during the glacial epoch, explain the distribution of plants and animals. As the cold became intense, they would invade the equatorial lowlands; and the inhabitants of these would migrate to the tropical and sub-tropical regions of the south, the southern hemisphere being at this period warmer. On the decline of the glacial epoch, as both hemispheres regained their former temperature, they again changed places—those not able to do so would die. Warm zones, whether of land or sea, being almost equivalent to life, it is evident that the growth and distribution of plant and animal life are due not to evolution, but rather to climatic agents. Every planet for a certain long period presents more of its northern than of the southern hemisphere to the sun at the time of nearest approach, and then, during a like period, presents more of its southern than of the northern hemisphere. As to the earth the slow rhythm of temperate and intemperate climates is completed in 21,000 years. The earth's orbit slowly alters in form, now approximating to a circle, and now becoming more eccentric. Nor is this all; summers and winters are more or less contrasted as the eccentricity of our orbit increases and decreases, having their least and greatest eccentricity one or two millions of years apart. To all this there is a response in the changed functions of living creatures, and perpetual ebbings and flowings of species over the earth's surface. Further, by slow yet inevitable change, by elevation and subsidence of land, every climate is altered, and every habitat of life is, in turn, destroyed and made new again. Parts of the earth, at one time thickly peopled, at another, are deserted. The result is, every extensive region has its own meteorologic conditions, and every locality in these regions differs more or less in its structure, in its contour, and in its soil. In our own land southern animals lived during the warm periods of the glacial epoch, and northern animals

[1] "Climate and Time," p. 407-409 : James Croll.

during the cold. The alternate successions of warm and cold periods bringing about the successive deposits, and leaving in those sediments relics of varying organisms. A surface would remain without seed or germ for many ages, then life would abound; and when the ice sheet again was spread, every thing animate and inanimate would be ground to powder.

Notwithstanding these statements by physicists, it is doubtful whether there were any other than mountain glaciers previous to the great glacial epoch; many geological facts evidence a former warm climate. In whichever way the question may be settled, the history of our earth shews the work of a "consummate strategist, who, from his mount of observation, directs the movements of a great army, nowhere setting at nought the laws of energy, but exhibiting and enforcing those laws in delicate, beautiful, marvellous, victorious operations."

"The early genesis of things,
To the open ear it sings
Of tendency through endless ages,
Of star-dust and star pilgrimages,
Of rounded worlds of space and time."

EMERSON.

The manifold facts, thus studied in rudiments of the world, are a manifestation of energy underlying all the phenomena, and extending to an infinity of worlds in variety of operation and mystery of life. Everything which strikes our senses is rooted in the transcendental. There is a continual passing from movement to repose, which is not final rest, a ceaseless oscillation from life to death, from death to life; the order of physical phenomena, like the order of mental phenomena is inscrutable, and flowing as an immense river from a past eternity into a future eternity. Is this vastness or incomprehensibleness of nature, a reason for relinquishing the study? Certainly not. "What can be a stronger stimulus to the zealous exercise of our best powers, than the conviction that though we may never be able to attain to 'absolute' truth, yet we can be for ever approaching to it, ever striving upwards so as either ourselves to reach, or to help our successors to reach, a still loftier elevation whence a yet more comprehensive view may be obtained. 'Tendre a la perfection sans jamais y pretendre' will ever be the animat-

ing spirit of the genuine philosopher, as the 'forgetting of things behind, and reaching forth unto the things before,' of the greatest of Christian apostles, will continue to the end of time to nerve the efforts of every true aspirant after moral excellence." [1] The continual effort of the creature to know the, at present, unknowable reality, is a conscious seeking after fulness of life.

An All-sustaining Power is everywhere manifested in the existence and phenomenal activity of the universe, who is alike the cause of all and essence of all, without whom the world would not be even the shadow of a vision, for thought itself would vanish. Beyond His infinitude can nothing extend, before or after His eternity can nothing be conceived. The knowledge of His essential existence is that to which the nature of things and the course of time conduct us. How we, the imperfect, are united to the Perfect, and things temporal to the Eternal, human eye cannot see. It is a mystery hidden within the depths of Divine essence, as is the union of mind and matter; but we know that imperfect beings, and therefore dependent, cannot be the authors of their own existence. The only possible origin of imperfect and dependent creatures is to be found in the will and power of the Independent and Perfect; therefore, the universe cannot be regarded as an enclosure, nor infinitude as an extension, nor time as a limitation of the Eternal. It is true that the repetition of organisms in time and space, the course of ages and series of expanse, the number of metamorphoses and progress of evolution, become practically infinite and eternal, but only to reflect the perfection of their author. This infinite series of advancing conditions is expressed by Leibnitz in a mathematical symbol, the hypothesis of the hyperbole. We have only to conceive for every given state of the universe a preceding less perfect state. Nothing hinders the supposition, and we may give it endless extension, yet all will be contained within the infinity and eternity of God, and such a world is the fittest representation of Divine Majesty. When, with the telescope, we contemplate the magnitude and numberlessness of worlds, and, with the micro-

[1] "Mental Physiology," p. 412 : Dr W. Carpenter.

scope, discover life extending beyond life, surpassing all imagination, we confess that herein God is glorified. All sciences declare infinitude in the multitude and delicacy of principles, in the grandeur and in the number of existences; time will never fail to conquerors in knowledge, and the regret of Alexander, that there were no more worlds, will never grieve us who march to new discoveries, ever and ever, of intelligence and power;

As lamps from off the everlasting Throne,
As stars of mercy, hung in night of Time,
To cast on men her light, and guide them Home.

Now, Picture Astronomic Realities.

The mighty mass of the sun rules from the centre a wonderful variety of planets; and a yet more wonderful variety of life. As fuel for his fires, he gathers from out of space, cosmical bodies with all the vital forces represented by their velocity. These chips in the great workshop of nature, this dust blown from the mighty grindstone of the universe, which the artificers, Attraction and Repulsion, have cast aside; are passed through fire that they may quicken and sustain worlds of life. Close round the Sun, Mercury, in dazzling splendour, flies with unmatched velocity; Venus, in her beauty, alone; Earth, with her one satellite; ruddy Mars, with two satellites; then, beyond his domain, hundreds of tiny orbs, every one in his own path careering round the Sun: many coming almost within hail of their fellow orbs. Then that wonderful outer family of planets, the least of which exceeds many times in bulk the volume of all the minor planets and asteroids combined. The vast globe of Jupiter, and symmetrical family of satellites; giant Saturn, of ring-system, as a shield, and eight primary attendants, the outermost of which has range of four and a-half millions of miles. Uranus and Neptune, brother orbs, nevertheless wide apart, and both so distant from Saturn, that the full span of Jupiter's orbit scarcely brings them together. Uranus, and possibly Neptune, rotating from east to west—unlike all other planets—their moons revolving in the same retrograde direction.

Thence we pass through a desert of vast inconceivable space, to those binary, triple and multiple systems, where sun moves round sun, with trains of planets and satellites, glorious creations making God's infinite mansion to sparkle with splendour. Separated, star from star, by enormous intervals of black or stippled ground; the intervals themselves open, so that the revelation of depth and height is rich indeed to the imagination; but, seen by our unaided eye, the whole splendour of many worlds is but a sparklet, or the scintillation of a needle-point. There are different orders of vapours or fluid nebulæ, perhaps first germs of worlds and systems, in infinite series, leading upwards through stages of process into suns and stars; stars that seem to be members of a new system of higher order; orbs which have no dominating centre; proving the sky to be more various and complicated in structure than even the wisest thought. Cloudlets, whether gaseous, stellar, irregular, planetary, ring-formed, or elliptic; and those light forms of the Milky Way; with shapes fixed or variable, governed by that unseen mysterious influence—gravity. There a green star with deep blood-red companion; there, one of orange hue, accompanied by blue or purple satellite; white mingled with red, light, or dark; purple, ruby, and vermillion; as "a casket of variously coloured precious stones."

Then, how far soever the spirit flies, finally stopping at the centre of centres, the centre of creation, the capital of the universe, whence are the laws which govern and uphold all worlds. Who shall describe that throne of might! that palace of splendour! that inner abode of Deity! What line shall measure, what space contain, what time can reckon, the roll, the circle, the vast procession of millions of clustered suns and systems revolving round the presence chamber of the Almighty! What painter could picture, what poet describe, what heart conceive, the beautiful grandeur of that source whence flow infinite and eternal streams of goodness!

Is it a dream, these worlds crowding the sky with more, and exceeding gorgeous dwellings, than any earthly city of myriad abodes? Will they pass away from thought, and leave no trace, as the baseless fabric of a vision? No: all

have their use, and carry into the invisible universe certain memories and memorials of the past as were every star a visible footprint of God. We look upon them from our dwelling, as records of the past, joining present and future transactions into that vast consciousness by which intelligent creatures discern the course of time. We remember what of love and fear, of joy and sorrow, dwell in one heart; how many hearts throb in the little star of Earth, and how numberless are the greater stars; until, translated in spirit by the wonderful, the soaring view, our souls full of grateful memories approach the eternal.

Oh! "to have
Attentive and believing faculties.
To go abroad rejoicing in the joy
Of beautiful and well created things;
To love the voice of waters, and the sheen
Of silver fountains leaping to the sea;
To thrill with the rich melody of birds
Living their life of music, to be glad
In the gay sunshine, reverent in the storm;
To see a beauty in the stirring leaf,
And find calm thoughts beneath the whispering tree,
To see, and hear, and breathe the evidence
Of God's deep wisdom in the natural world!"

N. P. WILLIS.

STUDY V.

THE ORIGIN OF LIFE AND THEORY OF RULE.

"We will trust God, the blank interstices
Men take for ruins, He will build into,
With pillar'd marble rare, or knit across
With generous arches, till the fane's complete,
The world has no perdition, if some loss."

E. B. BROWNING.

THALES (B.C. 636) considered that water was the source and continuer of life. Diogenes, of Apollonia (B.C. 400), said the air was ἀρχή, a beginning, a soul, such as philosophers sought, evolving itself in all life. Democritus (B.C. 460-357) taught that nothing existed but atoms and empty space, all else is mere opinion. Epicurus (B.C. 341-270) asserted that the mechanical shock of atoms is the all-sufficient cause of things. It was early maintained by Empedocles (he flourished B.C. 450), that the fittest survive, and unfit combinations rapidly disappear. Thence, till our own time, a few scientific men have held that—"Nature does all things, does them of herself without God." "The mechanical shock and interaction of atoms trying of motions and unions from all eternity, without any determination by intelligent design, account sufficiently for the constitution and phenomena of the universe." Atoms, individually dead, without sensation and intelligence, get up of themselves, run together, and being together, form all actual and imaginable combinations, as if under a drill-master, without a drill-master. Every one, by itself, is dead; yet, together, they live. When apart they are without sensation, and possess no intelligence; but, collectively, they possess sensation, are full of wisdom, and form the universal mind—if there is any mind. We are told,—"The physical philosopher can know nothing but matter, force, space, and necessity." Were we not sure that

there is indeed Intelligence at the heart of things, these men with their theories, which place our feet on the rungs of a ladder, the reverse of Jacob's, and leading to the antipodes of heaven, would make us say—

> "We are sick, and heart-sore,
> And weary; let us sleep—
> But deep, deep;
> Never to waken more."

Men, who believe anything that is not in Scripture, assert that all things exist by "*a continual becoming*," and that this intelligible hypothesis explains everything—"matter being eternal." Then we are told,—"Matter itself, as generally conceived, does not necessarily exist, but may be only a phenomenal centre of energy;" indeed, "matter is but the hypothetical mode of our own consciousness." This is delightfully clear,—naught is everything and everything is naught.

Some discern in matter "the promise and potency of all terrestrial life;" but, nevertheless, the "chasm" between our consciousness and this matter "must ever remain intellectually impassable." "Everything may be explained on mechanical principles;" yet, certainly things exist which are not material. "The so-called 'imponderables,'—things of old supposed to be matter—such as heat, light, etc., are now known by the purely experimental, and therefore the only safe method to be but varieties of what we call 'energy.'"[1] In maintenance of this principle it is affirmed, "There is one energy, and that is mechanical;" chemical energy is mechanical, only *something different*. "A living organism is entirely mechanical," but with its mechanical and chemical relations, *has something else* which is not like matter, nor like mechanical force. It may be fairly questioned by plain men, whether science is not hindered by such statements; chemical energy is something more than mechanical power, if, at the same time, it is something different; and a living organism is not wholly mechanical if it contains something not explainable by mechanics.

[1] "Recent Advances in Physical Science," p. 17: P. G. Tait.

A professor supposes, "that by the different grouping of the same units, and then by combination of the unlike groups, each with its own, or each with other kinds, you get everything else;" another professor talks about "Nature's great progression from the formless to the formed, from the inorganic to the organic, from blind force to conscious intellect and will," and the thing is done. The former professor gravely assuring us, "the system is now complete, no further advance in the same direction is probable or required." The latter stating, those who do not accept it have not kept pace with recent advances in natural history, are behind in science, and generally unworthy of consideration. So there is causality, but no cause; power, but no person; rule, but no ruler; and we are to graduate under Mephistopheles, who said,—

> "More brains have I than all the tribe
> Of doctor, magister, master, and scribe;
> From doubts and fears my soul is free,
> Nor hell, nor devil has terrors for me." FAUST.

The physical action which accompanies vital and mental changes is said to be an undulatory displacement of molecules, resulting in myriads of little waves or pulses of movement, so that states of consciousness are attended by the transmission of a number of little waves from one nerve-cell to another. Now, because life and consciousness and thought thus act on our bodies, we are told that the unit of motion is identical with the unit of feeling; that between the two there is such an unfailing parallelism that the one group of phenomena can be correctly described by formulas invented to describe the other group. Why, it is equal to the absurdity of saying that the oscillations of a needle are identical with magnetism, and that the two are to be recognised as one. These material phenomena are modes in which our existence reveals itself. They are not the occult reality, but the effects; and it may be that if we could know the intimate essence of our own mind, we might have a glimpse of that Inscrutable Existence of whom the universe is a multiform manifestation.

We are told,—"Life essentially consists in the continuous adjustment of relations within the organism to relations in

the environment,"—it is nothing of the kind ; the adjustment is caused by life, is the exhibition of life, not life itself. Some, seeking great accuracy, state :—" In the vegetal world, and in the lower regions of the animal world, the life is purely, or almost purely, physico-chemical ; it becomes more and more predominately psychical as we ascend in the animal world, until at the summit it is mainly psychical." Now, physicists are well aware that we do not know matter, only know states of consciousness which we call perceptions of resistance, extension, colour, sound, odour ; do not know motion, only know the sequent states of consciousness produced in the muscles of the eyes, or of the tactual, or of other organs, in the act of attending to the moving object ; it is therefore rather strange that they should expect to be believed that, by this thing which they know not, they are able, without any *occulta vis*, to explain some other thing which is more unknowable.

No one pretends that he can " cognise this *occulta vis ;* " yet it is sought, strange to say, among the dead ; for taking protoplasm, that substance in which life manifests itself, they kill it, find three compounds, carbonic acid, water, ammonia, the result of decomposition, which certainly possess no properties other than those of ordinary matter, and then try to find amongst these dead, the life—the *occulta vis.* Not finding it, they assert,—"This protoplasm is composed of ordinary matter, differing from it only in the manner in which its atoms are aggregated, and is again resolved into ordinary matter when its work is done." Then, to excuse the blunder of seeking the living among the dead, it is stated,—" the compounds or constituents of protoplasm, like the elementary bodies of which they are composed, are lifeless ; but when brought together, under certain conditions, they exhibit the phenomena of life." When we ask for proof, and carbonic acid, water, and ammonia are brought together, there is no protoplasm, nor any sign of life, nor is any process known in our laboratories by which life can be brought into existence. The mystery remains unsolved. Why the substance protoplasm should manifest properties which are not manifested by any of its constituents we do not know, and very likely

we never shall know. Mysterious as the fact is, it is common; for every chemical synthesis is the manifestation of a new set of properties equally insoluble. We say equally insoluble, yet must add, that though by chemical synthesis we do produce new sets of properties, we cannot, by any synthesis, construct organisable matter; the affinities of life and living matter belong to a chemistry which we do not understand, nor can we imitate. We cannot even make the dead matter, not a bit of that material which has the chemical relations of protoplasm; nor, if we had this dead matter could we give it the breath of life, or restore life to the tissue whence it had departed.

A peculiar operation must have accompanied the advent of life. By some grouping of particles into peculiarity of structure, by some undulatory displacement of molecules resulting in myriads of little waves or pulses of movement, by some energy, there was a new work. This new energy became one of the so-called natural powers: and now if a stone falls, if fire burns, if life lives, if mind thinks, it is an effect from the Great Unknown; not by fresh effort every time the stone falls, or fire burns, but by continual operation of the energy originally infused.

This may be illustrated by growth. "The faculty of combining heterogeneous compounds into matter like itself—growth, in fact—is the very thing possessed by no other substance in the world."[1] It is the product of an occult power, and protoplasm is on an equality with complicated organised beings. Let it be imagined that over the table and on the floor are spread in confused mass all the letters of the alphabet, capital and small, thousands intermingling; these are seen to be slowly adjusting themselves, until every scattered type has come into due place, and arranged itself for the printer to take the impression of a book. Of course some invisible power is at work. Work more wonderful than this is wrought by protoplasm, and any attempt to minimise the distinction and difference between living matter and dead albumen and protein is to confuse counsel. Take some complicate chance formation

[1] "The Protoplastic Theory of Life:" J. Drysdale, M.D., pp. 184, 185.

from the bottom, or from the shore of the sea, at the beginning of the world, "And when you have got this substance, you are as far on your way to albumen as a man ascending a hill would be on his way to the moon. And when you have got albumen, you are still as far from living matter as in the moon you would be from the fixed stars."[1] No natural process has been discovered which can explain the origin of living matter; and if such process were discovered, it would only show that God had mysteriously bridged the gulf which separates the dead from the living.

Thus, physical science, reverently waiting on the threshhold of existence, seeks to know the forms of the outer world by means of optical and tactual process, and to bring the how or manner of creation into representation for the perception of our inner man. The process is from without inward, and has a limit which cannot be passed—the Ultimate Cause being utterly unknown, though immanent in all phenomena—but we know that all animals and plants consist, in great measure, of fluid water. The material basis of life is albumenoidal substance; what life is, in itself, no man knoweth. We can only say, "Its working is a continual adjustment of internal relation to external relations."

Scripture draws another picture, not of the How, but of the Why there is life. By this picture we understand that through creation, redemption, regeneration, we have in time, in nature, in history, a revelation of those great acts by which the Eternal graduates us for everlasting existence. As in matter, the visible garment of the Almighty, there are infinite metamorphoses; as in life, we behold illimitable progression; as in the historic development of thought, we find how the mental habits of bygone generations enter the very spirit of present modes of thinking; so in Revelation we are taught to adore—not a Vastness which oppresses us, not a Power which terrifies us, but a Father who is leading us to complete fulness of life. Every temptation we resist, every generous impulse wisely yielded to, every noble thought that is encouraged, every sacred aspiration realised, adds its own

[1] "The Protoplastic Theory of Life:" J. Drysdale, M.D., p. 260.

energy to the impetus of the great movement which is bearing all true-hearted men towards a higher character and richer existence. Revelation shows that there is a Spirit of infinite perfection in whom we live and move and have our being: that all Nature is a Word of God coming from everlasting realms, bringing tidings of the past, and carrying intelligence to the future. Star-domed space is the temple of His Majesty, and our soul His inner spiritual jewelled chamber (Jno. xiv. 23).

We may ask—Have the living particles which are arranged into the shape of an organism an innate tendency to arrange themselves into the shape of that very organism to which they belong? This is a hard thing to say, and yet the tendency to assume the specific form must be inherent in all parts of the organism. What is the energy which gives this tendency? If we say polarity of the organic units, that is a name ascribed to atoms for something of which we are ignorant; nor does it explain what we want to know—how living particles, or units, possess the property of arranging themselves into the special structures which they construct? The power cannot be in the atoms of albumen, or fibrine, or gelatine, or the hypothetical protein substance, for in that case, how are we to account for the unlikenesses of different organisms? Laying aside these particles, the chemical units, can we find a sort of morphological unit, a microscopic cell, by multiplication of which all developmental changes are effected? No; for the cell is itself a manifestation of this strange power, and though cells are the ultimate visible components of many organisms, they are not universal. We are, then, driven to the conclusion that, complex as are chemical units, physiological or life units are more complex; and that difference of composition in these units themselves, leading to differences in the mutual play of energies, causes the endless variety of existing forms. Evidently, we have here a power, the nature of which is wholly unknown.

Oken said: "Every living thing arose out of slime, and is nothing but slime in various forms. This primitive slime originated in the sea, and from inorganic matter in the course

of planetary evolution." Oken might have stated it more Scripturally: in the water, and out of the earth, the Lord God made things to grow. Hæckel tells us: "Life is nothing but a connected chain of very complicated material phenomena of motion. These motions must be considered as changes in the position and combination of the molecules." Now, when a man says life is something that he knows of, and is nothing more, he would have us think that a wonderful amount of knowledge is in his possession: whereas in fact, as to life, no substance even distantly resembling organisable matter has ever been formed by man. The complex combination, when dead, is called "protein," but the living nature no man has determined. To minimise in words the distinction between living and unliving matter, does not alter the fact that the two are as far from one another as the east is from the west. Even supposing, but not admitting, that under certain circumstances we may be able to generate a low order of life by a peculiar grouping of particles, the mystery still remains unsolved. It may be possible to use Divinely given energy, or *occulta vis*, for the production of organisms, but that reads not the riddle any more than our use of galvanism explains the reason of galvanic powers. We know that the formative energy by which crystallising matter unites together, has its inner power by chemical constitution, and its external power by influence of surrounding matter; so the semi-fluid state of matter may possibly have passed into amorphous organisms, and thus changed form, as these organisms do every moment; but the ultimate causes, whether of physical or of vital phenomena, centre in mystery. "Autogony," or "spontaneous generation," are only dark words which veil ignorance by putting back, not explaining the difficulty.

The vital substance of the whole universe, identical for one and all living creatures, is semi-fluid, transparent, colourless, structureless. This is a window of truth through which the face of the Infinite may be seen: a pregnant and significant fact, proving that there exists beyond all our visual and chemical investigations, a distinct and special endowment of which we know absolutely nothing. It proves, in a

Divine sense, the doctrine of evolution: from this, which is as nothing, is created man.

This matter of life, one and the same for all, is neither indestructible nor unchangeable: it is formed of ordinary matter, and to ordinary matter returns. Fungus and oak, worm and man die, always are dying, nor can they live unless they die. "In the midst of life we are in death." Does protoplasm, thus living and dying, generate protoplasm, and so of itself, from the one primal substance, form plants and animals and men? No; only when it has been built by life into organism, into form of vegetable and animal, are vegetables and animals produced. Had we been present when living protoplasm was first evolved from not living matter, it is unlikely that the sight would have enabled us scientifically to bring together the physical, chemical, and other conditions of existence. We may speculate about all forms of life commencing as "Monera," or simple particles of protoplasm, and that these monera originated from not living matter; we may theorise as to the monera acquiring tendencies towards the Protista, others towards the Protophyta, and others towards the Protozoa; but, though there are structural analogies, no proof exists of passage from one to another. We may think of dead matter becoming living, and in our own way settle the dispute as to the physical basis of life, for certainly at the beginning, ere life was, something began to live that was dead before; but a looker-on at the primal origin of earthly life might not have seen more of a miracle, nor anything more startling, than there is in the beginning of a new life now; yet it was a marvellous crisis in the world's history, the beginning of a state the results of which no created being can calculate.

"The sun, the moon, the stars, the seas, the hills and the plains—
Are not these, O soul, the vision of Him who reigns.

. . . . . .

Speak to Him thou for He hears, and spirit with spirit can meet—
Closer is He than breathing, and nearer than hands and feet.

. . . . . .

And the ear of man cannot hear, and the eye of man cannot see:
But if we could see and hear, this vision—were it not He?"

TENNYSON.—"The Higher Pantheism."

We may, however, reverently draw nigh to this wonderful vision, and peer into the ultimate particles of living moving matter. What shall we find? Taking particles of protoplasm, they all possess the same microscopic structure, no physicist can detect any difference, within that apparent identity are those infinite varieties of molecular constitution and arrangement whence proceed all living things. This establishes an essential difference where human faculties and instruments find sameness; therefore no apparent similarity in the structure of the parrot, the cat, the dog, the monkey, can prove that they are essentially the same. In one anatomical element alone resides the attribute of life, whether it is plant, or animal, or man. The infinite difference and distance contained in this transparent, structureless, colourless, homogeneous fluid, set at nought every argument for Materialism; by proving the existence of things in matter which no physical process enables us to detect.

Now consider a remarkable assertion: "The absolute commencement of organic life on the globe I distinctly deny. The affirmation of universal evolution is itself the negation of an absolute commencement of anything. Construed in terms of evolution, every kind of being is conceived as a product of modifications, wrought by insensible gradations on a pre-existing kind of being."[1] By this theory, life began with portions of protoplasm—not protoplasm; more minute, indefinite, and changeable than those mere fragments of matter called "protogenes." Then by a process of action and reaction between incipient types and their environments, and the survival of those fittest to live, after an enormous period of time, the comparatively well-specialised forms of ordinary Infusoria were reached. We have stated the case clearly, for there must be no mistake. The conception of a first organism, in anything like the common or natural meaning, is wholly at variance with a right view of evolution: life sprang from no life—from nothing! There can be no greater condemnation of the system as an attempted explanation of the origin of things. We are virtually told—push back the beginning far enough,

[1] "Principles of Biology," vol. i. p. 482. Herbert Spencer.

and there will be no beginning. You may gradually organise an organism by such imperceptible and inappreciable differentiation, that life never begins as life, and the organism has no absolute commencement. We are to suppose that there is a vacuum, or something else; this nothing or something is to be turned about a very long time, no one can tell by whom, till the churning makes it very hot. Then, cooling down, the particles differentiate, assort, adapt, and combine themselves. After further myriads of ages, arise those beginnings of life which are not beginnings. At length come the protophyta, real beginnings, which insensibly advance into fragrant flowers, cereal plants, fruit and forest trees. With the protophyta, or soon after, grow the protozoa into all the animals. This doctrine is commended as natural and reasonable by men who tell us that the special creation hypothesis must now be consigned to that limbo where hover the ghosts of slaughtered theories. Instead of the declaration, "God said, let the earth bring forth the living creature," we are to take these words as more natural, simple, and reasonable concerning the origin of life: "It is an integration of matter and concomitant dissipation of motion, during which the matter passes from an indefinite, incoherent, homogeneity, to a definite, coherent, heterogeneity, and during which the retained motion undergoes a parallel transformation."[1] Will any one affirm that such an explanation is more lucid and explanatory than the words of Moses? "God said, let the earth bring forth grass, the herb yielding seed, and the fruit-tree yielding fruit after his kind, whose seed is in itself. Let the waters bring forth abundantly the moving creature that hath life, and fowls that may fly above the earth in the open firmament of heaven. Let the earth bring forth the living creature after his kind, cattle and creeping thing, and beast of the earth after his kind." Ask a truly scientific assembly whether "the earth bringing forth and the waters bringing forth," do not equally well explain the very doing of the thing, as the integration and concomitant dissipation, and the passing from some sort of indefinite incoherent homogeneity, into

[1] "First Principles," p. 396. Herbert Spencer.

another sort of definite coherent heterogeneity? Yet we are told: "Now that we have arrived at this formula, we find ourselves expressing it in terms that are universal. Instead of a mere law of biology, we have enunciated the widest generalisation concerning the concrete universe as a whole. . . . This leap of inference on Mr Spencer's part, like the similar leap taken by Newton from the fall of the apple to the motions of the moon, is the daring act which completes the formation of the hypothesis."[1] So that when a man, translating the formula, says "the joining of stuff into a lump, then the equal unjoining and sending out of movement from it, the making stuff pass from a no sort of unstickingness into some sort of holding-togetherness, while the movement not sent out undergoes a like change from no sort of keeping-togetherness into some sort of sticking," he explains the concrete universe as a whole. Really, we should not have known it, unless very clever people had told us.

A brief history of individual development gathers the mysteries of evolutionists into natural processes which are wrought continually. Take a vertebrate animal. Out of a single germinal spot are formed two cell-kernels. This process repeats itself until, by continual division or furrowing, a mulberry-shaped ball is composed. This globular lump of cells thickens at one point to form the actual body of the living thing, which soon assumes an oblong, then a fiddle-shaped form. From this shape may proceed fish, amphibious animal, reptile, bird, mammal, man. It is a simple oblong violin-shaped thin disc of three connected membranes, lying one above another. Out of the lower layer arises the inner delicate skin (epithelium) for the intestinal tube from the mouth to the anus, lung, liver, salivary glands, &c. Out of the middle layer arise all the other organs, muscles, bones, and blood-vessels. Out of the upper or outer layer arise the skin (epidermis) and the central parts of the nervous system (spinal marrow and brain). A central line or streak divides the whole into two equal lateral halves. On both sides of this furrow or streak arises a longitudinal fold,

[1] "Cosmic Philosophy," vol. i. p. 351. John Fiske.

which, growing over and joining, forms a cylindrical tube, the medullary canal, the foundation of the central nervous system, the spinal marrow. At first it is pointed at both ends, and remains so for life in the brainless, skull-less lancelet (amphioxus). In all other, the skulled or craniota animals, the fore end dilates into a roundish form as foundation of the brain. This bladder-shaped dilatation transforms into five, lying one behind the other, which are all the same in fowl, lizard, dog, man. The first, or fore brain, forms chiefly the hemispheres of the cerebrum—the seat of high mental faculties. The second bulb, the twixt brain, forms the centre of sight, and stands in closest relation to the eyes. The third bulb, the mid brain, vanishes into the so-called "four bulbs," a bossy portion of the brain, strongly developed in reptiles and birds, but in mammals it recedes. The fourth bladder, hind brain, forms the cerebellum, of which the most contradictory opinions are entertained, but it seems principally to regulate movements. The fifth bladder, after brain, develops into that important part of the central nervous system called "medulla oblongata." All these, originally arranged in the same way, develop into such different groups that it is very difficult to recognise their corresponding parts in fully organised brains. As yet, in this gradual commencement and apparently original equality, you cannot distinguish mammal, bird, reptile, from one another. The heart, the liver, the limbs, all parts of the body, are originally the same in all vertebrates, but from this stage proceed the ever increasing separation and differentiation of the higher animals, every one after his own order. It is a multiplication of mysteries. A moulding of manifold living creatures out of the same substance; a causing of infinite differences to proceed from the same original form. Men, mistaking the visible appearance for the inner mystery, and the representative process for the hidden power, inquire, —"Why this process of natural genesis? Why should not Omnipotence be proved by the supernatural production of plants and animals everywhere throughout the world from hour to hour?" As if God did not, hour by hour, produce from germ of plant and fish, of bird and beast, all the living creatures after their kind. What process is there that, long

continued, would not be accounted natural? But who knows that anything is natural? To call a thing "natural" is to pronounce it divine, or to make the word a cloak for ignorance. Scales, feathers, hair, fin, wing, limb, claw, paw, hand, are formed in successive processes of fœtal life, and by series of modifications, so small, that only the microscope can reveal the secret transformation. Changes into hoof or hand, into gill or lung, specialities of structure, variously adapted, and passage of lowest forms into highest and furthest differentiation within a few months, not by confusion of parts, but by variety of design, are that natural process whose initiation and continuance no one can explain.

Pass from the phenomena of life into those of mind, a region still more profoundly mysterious.

By union with matter, mind takes possession of a new world, doubling its powers of action, and extending its sphere of existence. Corporeal existence may indeed be the basis of intellectual activity, of moral agency, and of sociality among all created intelligent beings. When we consider the exquisite sensations of organised existence, the alliance with various properties of solidity and extension, the mechanical and animal indices of motion, the new consciousness of duration by collation of mental history with the equable motion and symphony of time in that vast horology, that register of duration, the material universe, we may conceive that body is to mind a means of existence serving such important ends, and carrying such consequences, as make it the general, if not universal, law of finite existence in all worlds: first, the natural, then the spiritual body (1 Cor. xv. 44, 45). We are conscious that energy and activity are infused into the most exalted of our moral sentiments by their alliance with animal sensations. If we were only animals, we should neither need nor possess an imaginative faculty. If intellectual only, or moral only, we should disregard as degrading or illusory whatever presented less than absolute truth, reason, and rectitude. Imagination and its sensibilities do now, however, abate or stimulate every function of life; mingle with and yet further ennoble the highest and purest of our intellectual and moral feelings; so that we possess the germ and instinctive expectation of another

and a higher mode of existence. This future and unseen world, brought thus into definite alliance with us, is as simply natural and true as the present nature. Our consciousness, our religious conceptions, our instinctive yearnings, take away the dim remoteness from the world to come, and connect our own homely land of trees and water with the momentous transactions of the future. The Bible, in telling us of our three stages of life—in the body, out of the body, clothed with spiritual body,—brings the visible and invisible worlds into that conjunction which the wisest and best of men accept as obvious and natural.

As to our own intelligence, it is certain that coming into contact with a corporeal state is not a degradation; and doubtless reveals a new sphere and mysterious power of influence, with various sentiments and modes of action, that would otherwise be wholly foreign to incorporeal existence. This means of quickening peculiar knowledge and varied action, bringing imaginative sentiments into alliance with animal sensations, their intermixture with ideas of beauty and order, not only forms part of our own training and transformation, but may have formed part of that discipline under which some angels fell, and by means of which some were exalted. We are not to apply this to those superior intelligences as if they, by any incorporation with gross matter, could attain a higher nature; but, without discussing the nature of their "spiritual body," or contemplating the possibility of spirits having come from a pre-existent state into the new order of things on earth; it is not inconceivable that even archangels round the throne of God may be connected with the energy, motion, heat and light of the universe, providential arrangements and occurrences (Ps. civ. 4; Heb. i. 7). The material universe may be the clock by which spirits become conscious of the lapse of duration; while the revolution of worlds, with their creative, sustentative, and renewing processes, make known another depth of the manifold wisdom of God (Eph. iii. 9-11), fitting them to be abler ministers to do His pleasure, and rendering them wiser agents in His Providence.

Great minds, discoverers of universal laws—Copernicus, who marked out the true path of our sun and earth amongst

celestial worlds; Kepler, who defined the curve described by the planets around their central luminary; Newton, who was able to fix the condition unique and supreme, whence results the equilibrium of worlds—did not study the universe as subject in all its movements to blind necessity, as were there no law, nor wisdom, nor beauty, nor harmony. Their investigation was a search for simplicity with comprehensiveness; and when the discovery of admirable symmetry and universal harmony established the all-pervading sway of power and wisdom, they bowed before the eternal throne, and worshipped Him who sat thereon. Their knowledge is now our own, and illumines the way to Him by whom our imperfections are to have remedy, our spiritual hopes are to be satisfied, and our yearnings after immortality are to be realised. What saith one of our students of science? "I protest that, if some great power would agree to make me always think what is true and do what is right, on condition of being turned into a sort of clock, and wound up every morning before I got out of bed, I would instantly close with the offer."[1] This he says unaware that the thing is done for the willing; not by degradation into a piece of mechanism, but by re-creation into the likeness of God. (1 Cor. i. 30.)

If the effect of exact science and advanced modern philosophy is to make a man to wish he were "a sort of clock," and made, even against his will, to "think what is true and do what is right," what a proof this is of Scripture—that we have all gone astray! How small, as to real value, are secular science and philosophy in comparison with the truth and moral power possessed by the real Christian who knows that his sins are forgiven, that he receives grace to resist temptation, and that he is being disciplined by the Spirit of God!

. . . "These are truths that wake
To perish never;
Which neither listlessness, nor mad endeavour,
Nor man, nor boy,
Nor all that is at enmity with joy,
Can utterly abolish or destroy."

WM. WORDSWORTH.

That we are under the guidance of a Wise and Beneficent

[1] "On Descartes' Discourse:" Prof. Huxley.

Power may be clearly shown. There is an orderly operation in the universe which produces other definite sequences and results. The law of the origin and progress of many and enormously extended series of natural phenomena has been attained with such accuracy and thoroughness, that we can prophecy their course with the greatest certainty; and, where the conditions are in our own power, direct them according to our will. By that one simple law of gravitation regulating the movements of the heavenly bodies, we determine and predict to a fraction of a minute, for past and future years, the motions of bodies distant and complex as the double, triple, and multiple stars. Knowledge extends our view to regions whence light, the quickest of all messengers, needs many years to reach the eye. We subject to our will the powers of a world greatly unfamiliar, partly hostile, and have their use for our reward. That which we grasp, or see, or hear, every thought or emotion of mind or heart, makes us conscious of things and processes of operation which our intellect, if sufficiently expanded, would be able to follow from beginning to end. The array of the external world, our own natural powers, all thought and emotion, or whatever goes to produce consciousness, and those sacred longings for pure and endless life, with the mysterious force of conscience, proclaim the great fact—that the ponderous and wonderful mechanism of the world is the product of some great Governing Mind.

A leader in science, and deservedly a leader in physics, has given his own revelation of world-government.[1] The figure is startling and daring,—"The chess-board is the world, the pieces the phenomena of the universe, the rules of the game are what we call the laws of nature. The Player on the other side is hidden from us. We know that His play is always fair and just and patient. But we know to our cost that He never overlooks a mistake, or makes the smallest allowance for ignorance. To the man that plays well the highest stakes are paid with that overflowing generosity with which the strong shows delight in strength, and one who plays ill is checkmated without haste, but without remorse." Shrinking from his own words, the Professor says,—They are like a picture of Satan

[1] "Liberal Education:" Prof. Huxley.

playing chess for the soul of a man, and "would substitute for that mocking fiend a calm, strong angel who is playing for love, as we say, and would rather lose than win." Afterwards, forsaking the angel, he says of our life's training,—"It is a rough kind of education, one in which ignorance is treated like disobedience, incapacity is punished as a crime; it is not a word and a blow, but the blow first without the word. It is left to you to find out why your ears are boxed."

In a sense, all this is true. If we break nature's laws we must pay nature's penalties. We have heard such wisdom from men ere this. Wisdom must be far purer and more spiritual if it is to strengthen and comfort us. Why not say, "Nature is by the will of God; he who breaks nature's laws breaks God's law for the uses and wants of our earthly being?" Clever words, well said, have salt in their wit—are pleasant and preservative. We like to hear them, but jesting speeches do not take from upright minds that distressing uneasiness concerning the great moral system, which is their present greatest trial.

All reasonable beings would gladly believe that there is a God, all-wise, almighty, all-perfect; but the existence of evil causes doubt and perplexity. In vain we try to stifle the doubt: evil, misery, ruin in this world and the next; the trials of saints and the sorrows of martyrs; great men, good men, gifted men in anguish; render the world a waste, and our path through it, not a way of peace, but a darkling road amidst mountains of despair. Are beings called into existence, and irrevocably destined to endless unmitigated torture? Are we to charge God with such acts of injustice and cruelty as render all the atrocity of men and excesses of the devil but exhibitions of perfect goodness in comparison? The doctrines of creation and Divine Rule render the fact more distressing, for they teach that every organism forms part of that grand design, or universal teleology, which includes whatever results from that design.

Having honestly exposed the difficulty, we candidly admit that, like many other mysteries of the universe, it is insoluble by our humble intelligence; but it is possible to give reasons for the existence of evil which, if they cannot remove the

whole difficulty, enable us to believe that what is unexplained will hereafter afford wonderful views of the power and love of God. In the study on the Pre-Adamite world the moral aspect is viewed; now take chiefly the physical.

Evil, as a fact, does not belong simply to theology. Atheism, in trying to get rid of it by a shift to chance or to fate, ascribing both good and evil to unintelligent causes, neither accounts for the vast preponderance of good nor alleviates the evil. That a mixed state of things is temporally necessitated by the physical constitution of the universe is certain. The earth has ever been a scene of warfare. Fossil structures, in common with the structures of existing animals, present elaborate weapons of destruction. There has been a perpetual preying of the superior on the inferior—a ceaseless devouring of the weak by the strong; and animals were so designed as to render bloodshed necessary. In innumerable cases the suffering inflicted seems to bring no compensating benefit; the inferior destroys the superior, and there are elaborate appliances for securing the welfare of organisms, incapable even of feeling, at the expense of misery to organisms susceptible of high happiness. Of the animal kingdom, half are parasites. Every known animal has its own species, and generally more than one. The Bothriocephalus latus and the Tœnia solium are two kinds of tape-worm which flourish in the human intestines, cause horrible distress, sometimes ending in insanity. From the germs of the Tœnia, carried into other parts of the body, arise partially developed forms known as Cysticerci, Echinocci, and Cœnuri, which cause pain and disease in the brain, the lungs, the liver, the heart, the eye, and other parts, often ending in death. Five other parasites of a different class are found in the human viscera. Another class of Entozoa, of the sub-division Trematoda, exists, of five kinds, attacking the liver, the gall-ducts, the portal vein, the intestine, the bladder, the eye. There is the Trichina spiralis in one phase of existence embedded in the muscles, and thence passing into the intestines. As to the external parasites, or Epizoa, there are creatures that bury themselves in the skin, and there lay eggs; others infest the surface of the body, and parasites are on every plant. Thus man, animal, plant, are

infested, and endure great suffering, even unto death. These details prove that pain and sorrow are not partial nor accidental, but wide-spreading as life, and wrought into the very nature of things.

Is it possible to extract good out of this evil? Try. In the lowest grades of existence are creatures wholly inert; their life is diffused, without central being, may be called external; yet, even in these, is a conflict of forces. Amongst them are living things with life and motion clearly manifest. Higher in the scale are organisms with members of greater variety and complexity, every one fitted to function; but life and activity are not at their best until some obstacle has to be surmounted, some difficulty to be overcome. Then action and reaction, the taking this, refusing that, the operation of will, come in; so that obstacles, difficulties, evil, are not something arbitrary, altogether hurtful, but the natural accompaniments of a limited condition—spurs exciting to defence and enlargement of the sphere of activity. Existence, notwithstanding this conflict, is better than non-existence; a plant excels a stone, an animal is superior to a plant, and of all animals man is best. Physical evils are undoubtedly among the elements of progress, urging toward relative perfection of life; the struggle to escape from the evil giving more energy, and leading to amelioration, to the casting off those peculiarities or infirmities which tend to nourish evil-parasitic life.

If a course of action is pursued, whch tends to throw anything out of balance, and so detract from physical or moral completeness of life, such departure from completeness, goodness, truth, is evil; and brings more or less of misery. Whether or not spiritual evil can poison the root of things, and cause degeneration and misery in lower forms of life, science cannot tell; but we may regard the moral sense of man as an analogue to the sense of pain shared, in some degree, by all conscious beings; even as spiritual improvement and physical betterment are both to be regarded as tokens of a perfection yet to be attained.

Thus viewed, evil is a temporary incident attendant on the growing supremacy and multiplication of the best. The beneficence of pain is seen as an incentive to action, to con-

sciousness, use and development of powers, enforcing obedience to law as the requirement and condition of a happy life.

When men assert the existence of evil to be inconsistent with the personality or with the goodness of God, they really demand a universe absolutely perfect from the beginning. Would such a universe mirror forth Divine power, wisdom, goodness? Free responsible beings are the highest created existences: amongst these, evil, sometime or other, is sure to arise; and extend, by their agency, to physical things. Are free spirits never to spring into life, lest evil drag them away? Must life be denied to infinite numbers of happy beings, delighting themselves in Divine Goodness, because the mysterious gift of freedom may be abused? Would not this elevate evil into a power restraining even Godhead, and under the world a vast expanse of stagnation, without life, growth, progress? Are not onward movements essential to the happiness of finite beings? and can we form any idea of life, growth, progress, without conflict, *i.e.*, without evil? The onward march of the universe through evil to perfection—a perfection never absolutely reached because infinite, is a higher conception of Divine working than the idea of a machine complete in all its parts, but incapable of development and progress. Those who think most profoundly on those deep things of God, believe that they fit into a vast design of wisdom and mercy, the full understanding of which must necessarily be deferred to a future further advance towards perfection. Scientific men will admit that millions of years are as nothing in the life of the universe; and if, in the brief period of human history, we can trace a gradual though slow abatement of moral and physical evils, all analogy leads us to extend that fact to the universe; and confirms the Revelation of the written Word that all things are in the hand of a mighty, wise, and loving Ruler—are moving through evil and by evil to more perfect good.

. . . "Life is not as idle ore;
But iron dug from central gloom,
And heated hot with burning fears,
And dipped in baths of hissing tears,
And battered with the shocks of doom,
TO SHAPE AND USE." —*Tennyson.*

STUDY VI.

THE CREATIVE WORDS.

Gen. i., ii. 3.

"Speaking is the revelation of thought; Creation is the realization of Divine thought."—*Keil and Delitzsch, Pentateuch.*

We pass now from purely scientific arguments to the Record of Creation in Holy Scripture. This portion of our subject demands expository treatment, and will lead to some of those transcendental, yet most practical truths which the Gospel Revelation proclaims. Our main object is to harmonize the Scriptural Record with the true conclusions of science.

Science confesses that the world is inexplicable without "the omnipresent existence (ignored by positivism), whereof the phenomenal world is the multiform manifestation."[1] Our previous studies show that there have been breaks of continuity in the visible universe which must have been bridged from an external source—"all portions of our science, and especially that beautiful one, the Dissipation of Energy, point unanimously to a beginning, to a state of things incapable of being derived by present laws (of tangible matter and its energy) from any conceivable previous arrangement."[2] This fact science, whose province is the discoverable, has revealed; what saith Scripture?

"In the beginning," בְּרֵאשִׁית; "of old;" ἀνάρχῃ, LXX; am Anfang, Luther; is to be taken as the head of all time, preceding every kind of existence—that commencement of Divine history when the ideal, fundamental, and eternal plan of God began to be realised in creation. Thus, the Bible in its first Hebrew word states a fact which it is now the glory of physical science to affirm. The earth and all things

[1] "Cosmic Philosophy," Pref., p. x.: John Fiske.

[2] "Recent Advances in Physical Science," p. 26: P. G. Tait, M.A.

therein, the heavens and all their host, "are phenomena the very nature of which demonstrates that they must have had a beginning, and that they must have an end."[1] There is no parallax by which to calculate the precise time, and there is no older event, for in the generation of the Son of God (Jno. i. 1-3) the same word is used to show that Christ is co-eternal with the Father. Not that Christ had a beginning, but in the beginning, being God and with God, He acted as the Creative Power.

As Creation was in the beginning, and began time, there never was a time without Creation. In carrying up the mind to a conception of the age of our own earth and planetary system, it must be remembered that physical statements, like those in study on "the Rudiments of the World," p. 76-80, are made, and rightly, on the ground of our belief as to the progressive order and continuance of things. It is not necessary as theologians, as physicists, or as geologists, so far as faith in God and Holy Scripture are concerned, to accept those calculations which assign great antiquity to our own world. Reckoned backwards—on scientific principles of progression from the past, and forwards—according to the doctrine of continuance,—they are affirmed by science not as absolute but highly probable facts. It was possible for God to have acted in any other way and by quicker process; and He may, as to the future, change all things in a moment; but, while chastened in mind by Scripture and preserved from secularism, we endeavour to use science as a light to the meaning of sacred physical statements that enlightened intellect and pious emotion may be alike content.

בָּרָא, Create, is the proper word to denote Divine production. Our faith pierces the phenomenal externality of the world to its supernatural and essential source, and has power to understand that the worlds were framed (Heb. xi. 3). Fuerst states, in his Concordance, that create has not essentially the meaning of making things out of nothing: "בָּרָא, *non habet producendi ex nihilo vim.*" The LXX version is *ἐποίησεν ὁ θεὸς τὸν οὐρανὸν καὶ τὴν γήν.*" בָּרָא create, עָשָׂה make, יָצַר form, interchange in use; for example, create and make

[1] "Advisableness of Improving Natural Knowledge," Prof. Huxley.

(Gen. i. 1; ii. 2) are make and create (Gen. i. 26, 27); form seems equivalent (in ii. 7) to make and create (in i. 26, 27); nevertheless, in Scripture the highest possible meaning is always the dominant, and passes by gradations into lower forms. We may safely say: "The Hebrew word is limited, in its primary meaning, to the working of God, and is never used in Scripture (where it is used in Kal thirty-five times) to describe the works of man, and presents an instance of the exactitude and precision with which the Holy Spirit writes."[1]

We are told—the Bible account of Creation "is discredited by its barbarous origin, and by the absurd or impossible assumptions which it would require us to make:"[2] "we may with equal propriety speak of the creation of cholera, of a conflagration, of a railway station, as of the creation of man."[3] In order to get rid of Special Creation, we are asked to believe that God did not create anything, or, at most, only little things; say—nothing larger than an infusorial point; and that a few clever men trace their pedigree from cosmic dust to sea-slime, from sea-slime to protoplasm, and from protoplasm, by successive evolutions, to the philosopher who weaves the hypothesis with scientific imagination and mends all breaks in the web with threads of fancy. For our own part, we cannot believe that the world, an unconscious thing, unconsciously developed itself—bringing things that are out of things which were not: we hold that "Nature's great progression from the formless to the formed, from the inorganic to the organic, from blind force to conscious intellect and will," must be accounted as God's way of doing things. It is absolutely and for ever inconceivable that carbon, hydrogen, nitrogen, oxygen atoms, should be otherwise than indifferent as to their position and motion—past, present, or future. Are we, "the cunningest of nature's clocks," to believe that there is no Intelligence at the heart of things? Are we to set our time as if it were more philosophical to regard unconscious, unintelligent energies as creators and guides than to have faith in God?

[1] Wordsworth's "Commentary."
[2] "Cosmic Philosophy," vol. i., p. 464, John Fiske.
[3] "Natural History of Creation," vol. i., p. 66, Dr Hœckel.

We are assured—"It is impossible to think of creation; and to prove it is the impossible task of establishing an equation between something and nothing." We reply—It is as easy to think of creation as of matter or space, of time or eternity; and the world is full of equations impossible to man and incomprehensible by human reason. The conception of matter acting upon matter is essentially incapable of being construed in our consciousness. Whether we regard the atom as divisible or indivisible, we cannot get rid of mastering difficulties, and the hypothesis of attractive and repulsive energies lands us in insoluble contradiction. The æther, the interstellar medium, in which the phenomena of light are displayed, surrounds and enters every solid liquid and gaseous substance; is imponderable, impalpable, cannot be isolated, nor compressed, nor attenuated, nor excluded from any space or substance; "its properties are those of a solid rather than gas, it resembles jelly rather than air."[1] It seems hardly credible that men knowing of these mysteries should refuse the Divine Mystery. Aware that their own mind, correlated with a complex nervous system, possessing minute particulars of organization, modifies surrounding agencies; yet, they tell us that Supreme Wisdom does nothing of the kind—"there is no intrusion of creative power in any series of phenomena;" "it is beneath a philosopher to examine the evidence for miracles." We are to accept the government of La Madre Natura, let her again have altars and groves; we must live simply for the moment's sake—immortality being a dream; free-will, virtue, responsibility—fond delusions. Why, Martin Luther would be very rude and say—"I would rather be in hell with Jesus Christ than in heaven with men like you."

"God created," בָּרָא אֱלֹהִים. The Hebrew noun is plural: *nomen majestatis.* The mind of the Church discerns in this a threefold Divine self-consciousness in inseparable and co-eternal unity. Jehovah the personal God, covenanting with men; the Son of God, incarnate, is Christ, very God of very God, neither made nor created, but begotten; the Holy Ghost, proceeding, is the Spirit moving upon the waters.

[1] "Fragments of Science," p. 4: Prof. Tyndall.

Trinity in unity is a transcendental doctrine. It began to be revealed when God created; it was further unfolded when the Spirit moved on the face of the deep; it was proclaimed in the counsel-words, "Let us make man;" it was formulated in the triplicate mention, "God created man in *His* own image, in the image of God created *He* him, male and female created *He* them." Trinity of name and person—Father, Son, and Holy Ghost: the trinity of work—Creation, Redemption, Regeneration.

The Doctrine of the Holy Trinity rescues us from what Spinoza says—"To define God is to deny Him, *Determinatio negatio est;*" rescues us from the error that thought and volition, as known to us, are the very nature and essence of the Infinite; and enables us to see that the personality is not a limitation, but an ineffable reality raising us from the error of regarding the Eternal as mere infinitude; and giving knowledge of Him as the all-pervading and all-sustaining Power. It meets, so far as possible, the difficulties of men like Goethe—"Since the great Being, whom we name the Deity, manifests Himself not only in man, but in a rich and powerful nature, and in mighty world events; a representation of Him, framed from human qualities, cannot be adequate; and the thoughtful observer will soon come to imperfections and contradictions, which will drive him to doubt—nay, even to despair; unless he be little enough to let himself be soothed by an artful evasion, or be great enough to rise to a higher point of view."[1] Thus, though we cannot by searching find out God, we may know all that concerns us, as intelligent and responsible beings, to know. We have revelation of Him, in a symbolic way, as the Source of all things, as the Power who is disclosed in every throb of the mighty rhythmic life of the universe, as the One from whom proceeds that moral law, obedience to which is our only guarantee of incorruptible happiness.

The going forth of creative energy is revealed under the symbol of a Word. The Word of God must have the highest power and meaning attributed to it of which our thoughts are capable, as representing an effluence of Divine will and energy

[1] "Eckermann," vol. ii., p. 357.

to fashion the universe out of chaos. Science represents this operation as an evolution "in accordance with discernible physical laws," but Scripture reveals that laws exist and act by a "Divine power immanent in the cosmos." The Word, or that which it represents, entered chaos, gave capacity to assume beauty of form, and energy of life. That the Word was not a sound, nor a voice of articulate words, is evident from the fact of our Lord being called this Word (Jno. i. 1-3). Word is the expression of thought, that by which our ideas become known to others: hence, doubtless, "Word" and "Said" are used for the creative acts which gave outward expression in matter to the types in the Infinite Mind. God's Words are the potential seeds from which spring into actuality that which Divine wisdom had eternally prefigured, even as our own thoughts and will are the ground-plan of our conduct, and the essence of our character.

Word מימרא, means or represents the mediative element or outward expression of Divine action, as wisdom is the mediative element of Divine presence, vivifying and uniting all things. The Word, as understood in Palestine, was the complement to wisdom—the Divine thought. The Greek λόγος (sermo, ratio) mingled the two ideas. "According to the later distinction of Philo, wisdom corresponds to the immanent word λόγος ἐνδιάθετος; while the Word, strictly speaking, was defined as enunciative λόγος προφορικός. The one prepared man for the revelation of the Son of God; the other for the revelation of the Holy Spirit." [1] The correctness of this distinction may be called in question—λόγος ἐνδιάθετος, מֵימְרָא is the immanent reason, in the Holy Trinity, viewed ontologically; but viewed deontologically (as here, Gen. i.) the λόγος προφορικός is the mediative principle (person) by which God expresses Himself in creation.

הַשָּׁמַיִם וְאֵת הָאָרֶץ. The heavens and the earth.

The heavens were created before the earth. How long before no man knows. The heavens mean, doubtless, heavenly bodies and the angels. Much stress cannot be laid on the words spoken to Job (xxxviii. 7), as to angels presid-

[1] Smith's "Dictionary of the Bible,"—Wisdom.

ing at the creation of the earth; the former half is obviously figurative, the latter may be also. There is an analogue of relation in creation to the Creator; creation is the Divine mirror—and the life of God, complete and hidden in Himself, is that internal source whence all things have sprung. We may count the external glory of the heavenlies, manifested in time, as a symbol of the inner and eternal glory.

The creation of heaven and earth, recorded in the first verse of the inspired account, is possibly separated by an interval too vast for human measurement, from the wasteness and emptiness described in the second verse; nevertheless, to regard the first verse as stating a fact—God created the heavens and the earth, and then to take the remainder as a narrative of the order in which the earth was framed, seems simpler and agrees with the Fourth Commandment. We obtain, moreover, a natural and consistent meaning by taking וְהָאָרֶץ הָיְתָה תֹהוּ וָבֹהוּ, thus, "Now, as for the earth, it was wasteness and emptiness," as the initial state, or condition precedent to the moving of the Spirit.

Whether space was furnished at once by the fiat of Omnipotence with burning orbs and glorious spirits, "the man of science, if he confine himself within his own limits, will have no answer."[1] Nevertheless, we may regard the time-world as the historical realisation of God's eternal design. This realisation was everlastingly decreed, but did not begin until the moment of living effectual interference: indeed, there was no time until creation, when the finite began to be; but after that were stages, intervals and processes of Divine effectuation. Angels preceded the earth, and rejoiced at its foundation. Wasteness and emptiness were moved upon by the Spirit, light shone, the firmamental tenuity was stretched out, there was a progression from the formless to the formed, from the inorganic to the organic, from animal instinct to human intellect and will. "There is nothing incompatible with the belief that all exercises of God's power, whether ordinary or extraordinary, are effected through the instrumentality of means—that is to say, by the

[1] "The Constitution of Nature:" Professor Tyndall.

instrumentality of natural laws brought out, as it were, and used for a Divine purpose."[1]

The seer beheld the earth, תֹּהוּ וָבֹהוּ, in wasteness and emptiness, shut up in gloom. Matter was there, but as the Germans say, "*öden-wüst und wüsten-öd*," shapeless, formless, unconditioned. Over the earth-materials, mingled with waters of the deep, which as yet were not waters, moved or brooded the Spirit of God. Whether we take the orthodox view, that the Holy Ghost was the agent, or a depraved interpretation, "the air or wind flutters while all is involved in darkness,"[2] we are assured that means were used, and the means were that energy which effectuated the Divine will.

The work upon dead matter, ascribed to the Holy Ghost, illustrates the enlightening, vivifying, ordering, elevating influence of the Spirit of God in our own nature. It is not a mere coincidence, that the long and varied operations of Creation, Providence, Redemption, Regeneration, are full of peculiar and striking resemblances. The culminating point in Christianity, the loftiest and most mysterious height of revealed truth, had its due place assigned at the very beginning. This is just what we ought to expect. The Divine and Spiritual are not unnatural, but the very soul of nature.

We have wheels within wheels, and rhythm within rhythm; of the inner quality working the wheels and producing the rhythm, enabling matter to attract matter, we know nothing: it may exist in the form of motion, that is dynamic energy; or in the form of energy, with distance to act through, that is potential energy. The convertibility of these energies consists solely, so far as science is aware, of transformations of dynamic into potential and of potential into dynamic energy. "The law which moulds a tear rounds a planet," in the application of law to Nature there is no such thing as small or great, for the soft wind gliding over an Italian mountain is firmly ruled as the earth in its orbitual revolution round the sun, and the gathering or dispersion of the slightest mist is by that energy underlying all things of which we know nothing,

[1] "The Reign of Law:" Duke of Argyle.
[2] "Essays and Reviews:" Mosaic Cosmogony.

except—that it is not matter. Notwithstanding, it is asserted —"Matter is the origin of all existence, in it all natural and mental forces are inherent;"[1] a statement which is at once disproved by the fact that energy is not matter, nor can we attribute it to matter as an essential part or property.

One of the hypotheses of science, it is but hypothesis, regards the primal matter as diffused stuff without structure, properties, parts, or indeed anything whatever; in which was no spirit, no life, no matter—such as we are acquainted with; and that out of this stuff matter was formed, or gathered, or contracted, by energy acting in a straight line, "push;" the "push" not being mechanical power, nor chemical, nor vital, but conveying them all, and furnishing infinite space with blazing suns and worlds of life. We can have no objection to this as a reverent attempt to explain God's way of doing things; but if stuff, push, space, are regarded as cause, continuance and end of all things—three idols; we must maintain that science knows no such idolatry, but endeavours to understand and explain—so far as human powers allow—in what manner God created the heavens and the earth, and what physical effects were consequent on that interference of Divine Energy recorded in the symbol—"The Spirit of God moved upon the face of the waters."

יְהִי־אוֹר וַיְהִי־אוֹר Let light be, and light was.

An example of brevity with comprehensiveness: a volume in a sentence. Not the creation of light, nor the first call into existence, is recorded; but the coming of light in place of that darkness which was upon the face of the deep. Light is not a substance, but, like heat and magnetism, a mode of energy: energy, giving that peculiar shivering brilliant motion to the ultimate particles of matter whereby the world is clothed with beauty: energy, causing and transmitting the molecular tremors of stars countless millions of miles distant, and translating them into that human consciousness which we call "Light." Moses, speaking of light as existing without the sun, anticipated on a large scale what Professor Tyndall beautifully performs on a small scale—the extraction of light from total darkness.

[1] "Kraft und Stoff," p. 32, Dr Büchner.
[2] "Radiant Heat and its Relations."

He who would have Apostolic authority for this statement as to the coming of light, and see the spiritual use made of the natural fact, will do well to remember "God, who commanded the light to shine out of darkness, hath shined in our hearts, to give the light of the knowledge of the glory of God in the face of Jesus Christ" (2 Cor. iv. 6).

וַיְהִי־עֶרֶב וַיְהִי־בֹקֶר יוֹם אֶחָד׃ Evening was and morning was day one.

The Days of Creation are fully investigated in Study VII.

The words light and darkness are no indication that creative days were common days. There is no mention of light and darkness after the fifth verse, in which night means the darkness which was upon the face of the deep, and day is the light which followed. Day is light put within limits; and night is darkness put within limits; but the days are not long periods of light alternating with long periods of darkness. Their measure and definition are not by light and darkness, the two sides of a common day, but by evening and morning. The peculiarity of reckoning marks a peculiarity like that in Daniel (viii. 26), where the vision of the evening and the morning is for many days. Knowledge of the earth's physical history gives grandeur to these days, some thought-standard of eternity—some measure of God's day. "We must not suppose that the evening and the morning were merely the sequence of the preceding darkness and of the light that followed it, notwithstanding that the first evening and morning so fittingly append themselves to such a contrast. Still less are we to think of the usual evening and morning, since the earth had not yet been astronomically arranged. Evening and morning denote rather the interval of a creative day, after the Hebrew mode of reckoning from sun-set. The morning that follows stands for the second half of the day proper.[1]" The fact of God setting certain divisions of time before the sun was conditioned, and then making the sun ruler, as He first formed the animals, and afterwards appointed Adam to be king, is not a mark of equal cycles, but that time-limits contain all created things.

[1] "Genesis:" Professor Lange.

רָקִיעַ Firmament, the heaven or sky of the earth-world.

The Greek word στερέωμα, and the Latin, firmamentum, have led some to think "that the Hebrews understood the sky to be a permanent solid vault.[1]" The Hebrews may have thought so; Moses himself may have thought so; some ancient nations may have had the idea of a solid firmament; but, nevertheless, firmament simply means extension involving great tenuity. The fowls flew in it, the sun and moon were set in it, and the stars lighted it. No candid reader will think that the inspired writer meant people to understand that fowls were flying in a vault, that the sun and moon moved up and down in it, and that stars were little lights thereof. Dr Kitto writes:—"A portion of the heavy watery vapour had flown into the upper regions, and rested there in dense clouds, which still obscured the sun; while below, the earth was covered with water. Thus we see the propriety with which the firmament is said to have divided the waters from the waters." The waters were not waters in the modern scientific sense; but that fluidity out of which land and water were formed.

The earth germinated and brought forth grass, herb yielding seed, and tree bearing fruit; which may be thus arranged—

דֶּשֶׁא Algæ, Fungi, Lichens, Grasses.

עֵשֶׂב Herbs, Vegetables, Cereals.

עֵץ Tree, or fully עֵץ פְּרִי Fruit Trees.

It is remarkable that the comprehensive word דֶּשֶׁא may include all that class of vegetable life which we call "Flowerless," that עֵשֶׂב herb, עֵץ tree, designate all flowering plants. It is not less remarkable, that this comprehension of all vegetation into grass, herb, tree, disposes of every attempt, by means of evolution, to discredit the Divine account. Indeed, the general summary accords with the indefiniteness of modern classification, and finds confirmation, so far as evolution is scientifically accepted.

The existence, moreover, of a certain common similitude

[1] "Essays and Reviews:" Mosaic Cosmogony, p. 220.

amongst organisms, so that all plants are akin, the kinship extending to and embracing even every form of animal life, has been cited in argument against the Divine narrative. The argument falls to the ground so soon as the fact is realised that He who established the simple primitive unity endued it with essential but, to us, undiscoverable differences; which grew up—if we speak scientifically—according to natural law into special structure and function of "kind after its kind."

Lights in the Firmament.

The lights are not the primal illumination אוֹר, light; but the collocation of light in such manner that there may be lights for many worlds. מְאוֹרֹת properly means luminous instruments, receptacles, places, or bodies whence light proceeds. The word was afterwards used in a wider sense, in poetry, as we use it—"Sun of my soul;" Prov. xv. 30, "Light of the eyes;" also in connection with the candlestick or lamp in the tabernacle, where a special dignity attaches to that light as emphatically "the light."

The sun, moon, and stars are spoken of in their relative importance as lights seen from the earth, not as they are in themselves. The word יִתֵּן, constituting them to be lights and signs, dividers of the day and night, and rulers of the seasons, means to crown or make a king, and is used of the firmament. In Psalm civ. 19 it is translated appointed—"He appointed the moon for seasons."

The peculiar power of the letter מ, showing that the sun is light-bearer, the instrument or holder of light, not light itself, but to regulate it for the future, seems to anticipate the following scientific statement,—"In nebulous sphere, just become luminous, and in the red-hot liquid earth of our modern cosmogony, light was not yet divided into sun and stars, nor time into day and night, as it was after the earth was cooled."[1]

On the Fifth Day, power was given to the waters, and they brought forth abundantly. יִשְׁרְצוּ הַמַּיִם, Let the waters swarm:—

[1] Professor Helmholtz: "Interaction of Natural Forces."

"Ut merito maternum nomen adepta
Terra sit, e terra quoniam sunt cuncta creata.
Multaque nunc etiam exsistant animalia terris
Imbribus et calido solis concreta vapore."
LUCRETIUS, *De Rerum Natura*, v. 793-796.

"With good reason the earth has gotten the name of mother, since out of the earth all things are produced. Many living things even now are being formed in rain water, and in warm vapours raised by the sun."

Moses had a deep scientific spirit. He knew, or not knowing, uttered that latest of truths,—"All living powers are cognate, all living forms are fundamentally of one character." He anticipated the researches of the chemist, that there is "a striking uniformity of material composition in living matter." He was not a "barbarous Hebrew" with absurd hypothesis—that species arose without natural agencies, without modification of organic or of living matter. He makes no mention of species, goes below them, declares that their unsearchable roots are in cosmical life—the waters swarmed. We may say, in Hugh Miller's words,—"What fully developed history is to the prophecy which of old looked forwards, fully developed science is to the prophecy which of old looked backwards." [1]

The great truth, declared by Moses, is affirmed by science that, regarding organisms, the difference as to one another is of degree, not of kind: a difference solely of molecular complexity. We are not warranted in thinking, though asserted by some, that vital energy and chemical energy are the same as mechanical power: nor that all substances are resolvable into one kind of matter "by the different grouping of units, and by combination of unlike groups, each with its own kind, and each with other kinds;" for there are secrets in every organism which we cannot hope to detect—barely to conjecture; things beyond our understanding, things outside the ordinary chemical and electrical affinities.

On the Sixth Day, God created חַיַּת הָאָרֶץ, the flesh-eating animal, or wild beast; הַבְּהֵמָה, cattle, or the herb-eating animal; and וְלֶרֶמֶשׂ הָאֲדָמָה, creeping things, all the lower forms of life which are on the land; לְמִינֵהוּ after their kind. The

[1] "Testimony of the Rocks."

fierce and terrible are first mentioned because terrible; the others follow in their apparent importance. It is probable that the order of life's appearance on earth was, first, with the lowest grades of vegetable and animal existence; and then, by progression, to the higher types; possibly according to the classes in which the flora and fauna are scientifically arranged. Animal life is thus classified, — Protozoa, Cælenterata, Annuloida, Annulosa, Mollusca, Vertebrata.

The arrangement in Scripture is probably rhythmical, not scientific, we have not only the six days apportioned into two triplets, so that the work of the first is completed on the fourth, that of the second on the fifth, and that of the third on the sixth; but the two triplicates are headed by the seventh or Sabbath day. These triplicates themselves are triple: in vegetation—grass, herb, tree; in light—sun, moon, stars; in life from the water—fish, bird, creature of length; in life from the ground —wild beast, cattle, creeping thing. Over all this life man is constituted king.

The evidence in favour of Evolution having shown some truth—though not the whole truth, it is one of the Bible's great triumphs to overcome all objections, difficulties, and doubts which arise on the supposition that the Divine narrative asserts the special creation of species. "The book does not so speak, as all may see who will."[1] Plant, fish, bird, mammal, man, were framed by a continually ascending process from unity to diversity. The fundamental statements enabling us to see, as by a succession of dissolving views, that God is the source of all things: so that Nature, endued with energy, advances grade by grade, until the earth is filled with life; do not reveal particulars of the process, nor by what means the great gulf between the dead and the living was spanned, nor how the vital spark was first kindled. These were left for science to discover — if it can: the province of science being the discoverable, that of revelation the undiscoverable. We now, and rightly, regard it as perfectly natural that the stately oak should be developed from the tiny acorn; is that really less miraculous, less divine, than the production of the earth's primal and rudi-

[1] "Cambridge University Sermon," Gen. i. 1: Rev. T. G. Bonney.

mentary forms? Is there, not, indeed, between the inanimate ground and the acorn, between the acorn and the oak, a somewhat similar passage from the inanimate to the animate—a continual coming of life from the dead; which, though it does not seem to require the vital spark from heaven, as in the first operation, nevertheless maintains the light and heat in a manner not less wonderful than was the primal origination? If this be granted, then the manifestation of God in Nature is credible and scientific; and grades of life are steps on God's great altar-stairs by which life, onward advancing and upward ascending, approaches the ever-living One.

נַעֲשֶׂה אָדָם בְּצַלְמֵנוּ, "Let us make man in our image."

Job (x. 9) said,—"Thou hast made me as the clay." God gave the spirit of life to the frame which He had formed out of the dust, and so man became a living soul—of the earth, earthy, but of the soul and spirit, heavenly. When nature-life, as distinct from spirit-life, had attained the summit of opulence and intensity in animal-life, then was created a form for spirit-life. The vegetative life had been subordinate to the animal, now animal life is made subordinate to the spirit, and Adam comes—the up-looking one, and moving principle of the earth's history.

We must not imagine that God's hands formed a clod of earth into human form, and, standing near to it, breathed into it from without the breath of life. The hand of God is the power of God, which, even in visible things, works invisibly. Man came into existence, as did also the other creatures, by Omnipotence acting invisibly; but, as to man, a solemn word of Divine self-determination and mysterious meaning preceded the creation. The Words of God, as we have said, represent the energy by which material is formed, fashioned, and vivified—beasts in their impersonality, man in his personality; beasts by a distribution of existing materials, man by God's immediate formation, and, as it were, by God's breathing; so that he is, in spiritual person, akin to God, and rules as the God-man. The Breath of God did not become a living soul, but made man to be a living soul—a candle illumined by the Lord.

This illumining we are not to apprehend as endowing with spirit, but rather a creating in the soul of spirit elements as man's true spirit-form. The Breath of God is that Divine energy which is the God-willed spiritual personality.

Man in the "image of God" means the ideal, or sort, or kind. In the "likeness of God" means the relation or order of spirituality essentially distinguishing him from brutes. Man is neither, as to his body, the precipitate of the spirit; nor, as to his soul, the sublimate of matter. He is a combination of both in Divine origination as to the body, and by in-breathing as to the soul. The body, thus fashioned, is to receive at the resurrection a re-fashioning of glory; and the soul, now possessing not only the life which God wrought in matter when He made the brute, but that life in union of soul and spirit which was effected by Divine inspiration, receives yet higher blessing and energy through the incarnation of Christ; for Christ, the form of God in heaven, assumed the fashion of man on earth that He might fill the earthen vessel with heavenly treasure. Thus, the Word of God is a voice of good tidings bringing life and immortality to light. First the natural body, then the spiritual body. As glimpses of heaven become clearer, let us press onward, unfaltering, untiring, till we have our everlasting abode in the new land brightening in the smile of Christ our Lord.

Materialists assert—"That which we call spirit disappears with the dissolution of the individual material combination."[1] There is no proof of such positive statement, nor is proof possible. Matter is only known by mind; and while maintaining that the smallest particle of a grain of sand is utterly and for ever indestructible, we cannot think that our inner personal individuality, all that by which we understand the mechanism of worlds, is extinguished at death as by the extinction of a light. We do not know, and probably never shall know, how matter is able to assume consciousness; how, then, are we to believe that materialists know there is nothing more in the universe than matter. If we accept the words of Locke as to all our ideas depending upon the senses —"nihil est in intellectu quod non prius in sensu"—we add

[1] "Kraft und Stoff," p. 13: Dr Bückner.

the correction of Leibnitz—"nisi intellectus ipse"—as to the independence of mind.

As to Providence, God, and Creation, we are told—"What this or that man may understand by a governing Reason, a universal soul, a personal God, &c., is his own affair. The theologians, with their articles of faith, must be left to themselves."[1] So we are to give up every hope as to the future, cast to the winds all reverence for God, and believe—not that God created all things out of nothing, but that all things created or evolved themselves out of something very little better than nothing. A man may as well say—"There is nothing behind the door"—simply because he cannot see through the door; as deny the Divine act of causation, because he cannot detect the *occulta vis*—the Hidden Energy.

Accurate investigation enables strong men to check naughty little ones, who count it a stroke of wit and genius to scoff at those things which greater minds worship. "The dogmatism approaching puppeyism" which places something infinitely less than a tadpole at one end of the series, and man at the other, and professes to know all about it, must be rebuked with calm and simple statement. One line of thought is sufficient. The Book abused by Secularists as of barbaric origin, rules the intellect, emotion, and conscience of the civilised world; and wherever intellect is enlightened by it, or morals are purified by it, or conscience is instructed by it, men live rightly for mutual welfare and the glory of God. Materialists, abusing the doctrine of Evolution, assert that an infinitesimal something, by imperceptible accretion and infinite variation during immeasurable time, became worlds of life and beauty, apart from God, and without any ordering of Providence. Writers of the Bible, especially Moses, connect the natural with the supernatural, man with God, state that the universe was originated and is maintained by the Diety, and that by Divine inspiration they give an account of the creative process. The whole matter is capable of disproof, or it can be verified. An unscientific age could not possess the knowledge of our own scientific time, nor

[1] "Kraft und Stoff," p. 43: Dr Bückner.

men styled "semi-barbarous" be adorned with the accuracy and genius of modern professors. The words written by one of these men have been studied in part, and will be further investigated. As yet, nothing has been found contrary to science; where science can effect research, there has been verification, and the recesses of nature have been found to contain counterparts of many spiritual truths. In further applying accurate modern tests to the Inspired Record, which most of us love and regard as true without and beyond confirmation, bear in mind that authoritative statements about facts or phenomena can only be found perfectly to agree with science in its final results, and this agreement must in no wise be hastened. We say authoritative, because due exception has to be made for accounts which are popular, or figurative, or poetical, and not meant to assert physical law. Not only so, we must allow that the word was spoken —not to anticipate discovery, not to render experimental and inductive processes of the human mind unnecessary to the attainment of knowledge, but to set up an authoritative teaching where experiment and induction are inadequate to explain and establish the relations between God and man, and between man and his neighbour; and to erect true foundations of the body politic on an immutable, because Divine, morality; and to train the individual for his probation in time, and for his future life in eternity.

If, after most careful analysis, the record of physical facts be found sometimes scientifically inaccurate, not the less will Holy Scripture contain the Word of God. A diamond is not the less a diamond because of the rudeness of its setting, and the truths of Holy Scripture are not less Divine, because the frame-work partakes of human imperfection. If every effort fail, even then, human fallibility cannot affirm, as infallible dogma, essential contrariety: the angle of parallax, by which to measure the lights of God, may have its base in an existence which is wider than human life.

STUDY VII.

INTERPRETATION OF THE DAYS.

"Cogitavi dies antiquos, et annos æternos in mente habui."—Ps. lxxviii. 5.

"Les jours de la création marquent la hiérarchie des êtres et des époques successives de leur apparition sur la face du monde ; mais l' action de Dieu ne se décompose pas en époques. Elle est une puisque elle est parfaite."—EMILE SAISSET.

WE have considered the days of creation, well knowing that simple truths are often deep.

What mean these days? Are they an enumeration and a separation of actual days and nights, before the earth and sun were so conditioned, each to each, that day was possible? Or do they mean that there were births, growths, and seeming pauses, in the progress of Divine work? The latter opinion prevails with many thoughtful men. They take the outward appearance as a garment for the spiritual reality. The letter is the body, the spirit is the soul. The letter and the spirit are held together by the real meaning. Endeavour to attain that meaning, as to days, by considering—

The facts on which most men are agreed.

1. On scientific and scriptural warrant they believe that the origin of the world is very ancient; so ancient that the beginning, in which heaven and earth were created, is taken by St. John (i. 1) to prove the co-eternity of Christ with the Father. Placing, however, the beginning of things thus early (Gen. xlix. 26; Deut. xxxiii. 15; Job xv. 7, xxxviii. 4; Ps. xc. 2; Prov. viii. 22-31; Jno. i. 1-3, xvii. 24); neither lessens the marvel nor destroys the fact of creation.

2. There is no more matter now than was originally created, nature not possessing the power, in itself, of originating matter; but cosmic processes throughout the universe, and the "fact that God is daily and hourly creating those myriads of human souls which He infuses into the bodies

prepared by His providence,"[1] convince many that creation was not an instantaneous, but a continuous and progressive series of marvellous contrivances. It is true that of a *creatio continua*, in the special sense of creation, Scripture knows nothing; nevertheless, of creation as a continuous agency of God, and specially of the Divine maintenance of the world as a *creatio continua*, Scripture does know (Is. xl. 28, xlii. 7); and if we regard the human spiritual nature as so planned that, associated with matter, it is able to propagate itself out of itself, this procreative process can only be explained by the co-operation of God's creative power,[2] and the continuous process is not less divine than the growth of a world in an hour.

3. Man has existed on the earth more than six thousand years. His remains and implements are found in places, and side by side with such relics of plants and animals, as leave little or no doubt of a higher antiquity. The cave deposits, peat and shell mounds, lake dwellings, though not as yet giving any reliable data for estimating the precise age, may be fairly taken as proof that man contended with the mammoth. The genealogies of Christ, commonly and erroneously taken to show the age of man, are meant to indicate the line and families of Messianic descent; not always by actual procreation, but occasionally by adoption, or other succession. Hilary says,—"There are four genealogies of Christ in the four gospels: 1st, in St. Matthew, from Abraham; 2d, in St. Mark, from God the Holy Ghost; 3d, in St. Luke, from Adam; 4th, in St. John, from Eternity." These show, not the age of the world, but that Jesus is the seed of the woman, the second Adam, the father of a new and spiritual race.

4. The world is continually though slowly changing; new animals and plants arising with varied modifications, or becoming extinct, by the slow successive determinate action of local causes; of which the chief is the gradual lowering or raising of temperature. Iceland, a thousand years ago, according to Icelandic histories, was covered with forests of birch and fir; and at that time Greenland was fertile in the

[1] "Daniel the Prophet," Intr., p. xxii.: Dr Pusey.
[2] "Biblical Psychology," pp. 133-142: Prof. Delitzsch.

South. Our own country has sunk many times beneath the sea, and again been raised.

Men generally agreeing as to the four classes of facts which we have enumerated; 1st, the antiquity of the earth; 2d, its progressive formation; 3d, earlier occupation by mankind than is given by the common date; 4th, the orderly continuous and progressive operation of nature; are met by assertions of this kind. "It is not likely that God should have inspired Moses to write a history of creation to be believed by all people, in language the meaning of which it were hard to find, and yet harder to believe."[1] Timid souls, rendered more timid by the reckless unbelief of godless men, cling almost superstitiously to the old ways of explanation, and say,—"There is indeed a measure of difficulty, and a kind of unnaturalness, in giving a different sense to the words than that which has been generally accepted; and which, unless required by science, no one would think of giving." Students of science, provoked by this obstructiveness of ignorance and of fear, reply with some scorn,—"We know, even as a matter of common sense, that God did not make the world in six days, and no man of science believes that He did. Cannot you, Divines, while contenting our emotions, satisfy also our intelligence?"

They have been answered by an explanation of the manner in which it is conceived the world was created in six days. That heaven and earth were created in the beginning; and that the six days' work was the restoration rather than the creation of the earth. In that beginning, angels were made, in some way or other connected with the earth; animals and plants, in great variety and beauty, lived, passed away, and were succeeded by others. It was a golden age: no sin, no sorrow, everything good and very beautiful. In process of time, some of the angels sinned, and cast the earth into chaotic confusion. Then, Divine power reformed the world, as we now see it, with man as chief; who, after due probation, was to occupy those places in heaven from which the evil angels had fallen. In commemoration of the work, and as a measure of the days, Holy Sabbath was instituted. In that primitive period are to be found all those crises and

[1] Suarez: "Tractatus De Opere Sex Dierum," Lib. I., Cap. xi. 42.

periods required by geologists; and to those ancient ages must be attributed those spectres—the fossils and animals of astonishing form, which are unfolded in the rocky pages of the earth as a revelation of the mysteries of former existence.

This statement about angels, happy eras, and chaotic relapse, does not content thoughtful men, who require a substratum of fact on which their intelligence may faithfully erect a house of piety. They reply—"There is no great break of continuity, or universal chasm, separating the former good time from the later evil time; go back far as we may, dig deep as we can, death reigned in the world even as now. The stony leaves of ancient history bear no record of angelic life, the legend is alway of the destroyer and of the destroyed. On these leaves are impressed and printed likenesses and relics of vegetable, fish, reptile, bird, mammal, and human organisms. Life following life, with hundreds and thousands of feet of slowly deposited rock intervening; but no record of peace, no footprints of angel. There are different ages of life, and various stages of growth; some are young, others old. Their history states that they devoured their fellows, and propagated their kind. Worn teeth and aged structure prove a long duration of individual existence, and many relics are token of continuance as to species. Would you have us believe that within six days the firmament was spread out, land raised from the sea, and dried; that trees grew up bearing on their bark, and in the rings of their structure, record of centuries; that river channels were worn and excavated through thousands of feet of solid rock, leaving in the different stages of depth countless generations of creatures which grew, performed all the natural functions, and at length died of full age? Are all these marks of progress, and tokens of age, mere freaks of construction? did vegetables grow up instantaneously for full grown animals to feed on; and fruit, already ripe on the trees, delight the sight and taste of man; and, at the latter end of the sixth day, was Eden planted, were beasts named, did Adam sleep, and was Eve formed? Are we as geologists, naturalists, farmers, or men of general observation, to credit all this? That old

world, moreover, was not an existence wholly good: it is hard to conceive that the monster forms which existed were suitable companions for holy, happy angels, or that the bone-breaking and fierce devouring by these creatures belonged to a pure and peaceful existence. Nor was it separated from the present world by utterly destructive catastrophes: it contained all those plants, animals and men whose remains, so strangely revealed to us, are brought from one common grave. Extinct species are so mingled with those now in existence that the two worlds overlap each other, indeed are not two worlds, but one; for there is no trace of any chasm, deep and wide, engulfing that first or former creation in utter destruction; no universal break found in which the old world passed away and the new began.

These statements, of honest and wise opponents, are very strong proofs that the Day theory is inadequate, unscriptural and unscientific. Some further consideration may lead such as hold that theory gladly to abandon it for one that contents piety and satisfies intelligence: one that unites the view of the prophets with the requirements of modern science.

In an apparent vision, or narrative, or dream; or by whatever means we possess the memorial of creation — whether as picture for the seer to look on, or as history for the prophet to write; it is certain that the whole representation, if Divine, would in its very nature transcend physical science. It must be borne in mind that the Hebrew language has no scientific terms; so that, whether dealing with science or prophecy, symbols must be used. It also seems natural that the word "Day" should be used. What so natural as the use of a word which includes the work of man, for containing and describing the work of God, and for a symbolical measure of time? Fitness and simplicity, moreover, would take evenings and mornings for divisions; darkness and light for pauses and operations in the sublime scene. As past, present, and future are distinctions for man's use only, and can have no real meaning in reference to Deity, they are often ignored in Holy Scripture. The prophet not unfrequently speaks of the future as actually present, apparently, perhaps really, unconscious that centuries have passed away, or will

pass away before the prediction can be fulfilled (Is. ix. 13; Jer. xlix. 28-30; Is. xxxiv. 5, x. 34, xi. 1).

The prophets did not always understand their own writings (Dan. xii. 4; Eph. iii. 5; 2 Pet. i. 19-21). In many holy reflections, Divine realities are clad in garments of imagery (Ps. xix. 1-6). The Tabernacle was a figure of good things to come (Heb. ix. 8, 9). The sacrifice of Isaac had a deeper meaning than Abraham knew of (Heb. xi. 17-19). The child promised to Ahaz (Is. vii. 14); the man of sorrow, in whose hand the pleasure of the Lord was to prosper; and who, though dying, was to prolong his days (Is. liii. 10). All these are examples and proofs that the Word of God is high and deep, full of mystery to feed the curiosity, exercise the powers, encourage the hope, and augment the wisdom of men and angels. They may help us to understand the true meaning of the language in which the Mosaic account of the creation was revealed.

There is a correspondence traceable between the first three and second three of the days in which God created the heaven and the earth. The first, second, and third days answer, severally, to the fourth, fifth, and sixth days. On the first—there is light, on the fourth—light-bearers; on the second—the waters are separated and the firmament is constituted, on the fifth—the waters and firmament are occupied by fishes and birds; on the third—dry land appears, on the sixth—it is replenished. A comparison of one part of Scripture with another also suggests that the idea of completeness and perfection is presented by use of the number seven in the Mosaic record. The seventh day, or Sabbath, is the key-note in every Hebrew observance; the factor in all sacred times and things; ruling days, months, years, and jubilees. It is part of the civil and of the ecclesiastic law. It concerns master and servant, the home-born and stranger, the harvest and the beast of the field. There are seven spirits, seven stars, seven angels, seven churches, seven seals, seven trumpets, seven vials. It is the representative symbolic number, the subject for precept, the rule and measure of observances, possessing internal properties and external associations. Internal—as the symbol of Divine and human labour and

rest. External—as to periods and numbers, impressing times and seasons with a seal of sanctity. The seventh month ushered in the Feast of Trumpets. Seven weeks were the interval between Passover and Pentecost. The seventh year was Sabbatical. Seven days were the measure of feasts, of the time occupied by priestly consecration, and removal of legal uncleanness. The sprinkling of purification was seven —whether with water or blood. The arms of the golden candlestick were seven; the chief vessels of the Tabernacle were seven; and there are sacred sevens for forgiveness, for perfection, for interpretation of prophecy. Through God's creation, sevens express the arrangements of nature, the laws of labour, the sanctification and division of time, and form part of God's commands (Gen. ii. 3; Ex. xx. 9-11, xxxi. 12-17). It may then be inferred that the Scriptural account of creation was intended to be regarded as pictorial, symbolical, mystical.

Now, consider the various uses of the word "day."

Fuerst observes in his Lexicon, that Day only exists in derivative senses, and is used to signify a period. Eating the forbidden fruit, and the consequent liability to death, are called one day—the day of death (Gen. ii. 17). Day of the Lord is a period of mercy, or a time for the acting of God-power. Day of vengeance is time of punishment. Day of judgment is the crisis of doom. Day of rest is a figure of repose after the creative act, and a symbol of the great duration of our own rest in Heaven (Heb. iv. 9). Origen says "a whole age is a day."[1] Day is time of life, one who has a hard time, heavy time, יוֹם עָנְמָה (Job xxx. 25). Day is time of light, לְאוֹר יוֹם, in the sense of light being day (Gen. i. 5). Day is present time (Ps. ii. 7); "This day," now "have I begotten thee," הַיּוֹם יְלִדְתִּיךָ. Day is before now וְלִפְנֵי־יוֹם. (Is. xlviii. 7).

No man is able to determine the duration of the first three days, light and darkness depending upon conditions with which we are unacquainted; and what about day in the arctic regions where there is a six months' night? That the ordinary time

[1] "De Oratione," p. 249.

was not meant, seems clearly indicated by all the days being called one—"the day that the Lord God made the earth and the heavens" (Gen. ii. 4). To insist upon twenty-four hours as the limit, now that we have exacter knowledge, both of Scripture and Science, is to make knowledge useless. The light was day, the darkness was night. In contrast with this, evening and morning are used to designate the creative period; and on the seventh day, as if to show that the Sabbath day is not yet ended, neither evening nor morning is mentioned. Evening and morning, speaking exactly, do not include a day, do not mean darkness and light, but the creative period—the period of strong and beautiful world-building process: "it was evening and it was morning day one."

The extent of duration must be fixed according to the nature of the realities signified. Take a few examples—"Thou art to pass over Jordan this day," the day meant a time not ending till after the death of the speaker (Deut. ix. 1). The day of temptation (Ps. xcv. 8) was a period of forty years. In Joshua iv. 6, "the time to come" is literally to-morrow. In Ps. xc. the words—"A thousand years in Thy sight are but as yesterday when it is past, and as a watch in the night," seem to tell us that if Moses wished to indicate long age-periods, he would use the word—days. We may conclude that "the days are representative terms, on the same scale as work and rest. . . . All alike denote Divine realities, answering to human ones in precisely the same manner. As truly as God's work is similar to our work, and His rest to our rest, so are His days to our days."[1] When in the cosmogony, we read of six days, we have no more right to suppose that in six periods, every one of twenty-four hours' duration, God made all things; than we have to suppose that He literally gave Hebrew names to things, and rested; but we are to understand that He created all things in such periods of time as might to man's finite mind be most fitly represented by six days.[2]

Two difficulties now meet us—

1. If the days mean vast periods, a great space should be

[1] "The Week of Creation:" Geo. Warrington.
[2] "The Week of Creation:" Geo. Warrington.

occupied by plants only, then by plants and fish, after that by plants, fish, and other animals in layers, answering to the time of their creation; but no such separateness exists — the organisms overlap both in place and time.

2. If day means age, the ages would, according to the figure used, be separated by long intervals of darkness destructive to life.

As to the darkness, a sufficient reply has already been given: Evening and morning, of the Divine account, do not mean day and night. Light is called day, not as meaning twenty-four hours, but that which was produced by operation of the Holy Ghost; and the darkness is called night, to denote that chaos out of which light was brought. Anyone of sufficient attention may observe that, in the fifth and in the eighteenth verses of the first chapter of Genesis, day and night are spoken of separately, and in contrast with the evening and morning in verses 5, 8, 13, 19, 23, 31. In fact, as in Daniel viii. 26, "the vision of the evening and the morning which was told is true; for it shall be for many days."

As to the other objection—The creative process of plants and animals was by orderly advance to the higher organisms; and is rightly represented, as it would appear to man, in succession. There was a time when no life existed, then came the rudimentary plants, then moving creatures of the water, and after that land animals. The preparation for and initiation of all life was, doubtless, by somewhat similar and, to a certain extent, simultaneous operation. Life, in the sea, did not wait until vegetation had done a perfect work; nor had the sea become full before the land began to be inhabited. There were no grand tenantless forests on the shores of vast dead seas; wherever nutritious plants grew, there animals existed. This fact explains and justifies the Scriptural use of the word "day;" in one sense, the almost simultaneous origination of initial creative processes is represented; and, in another sense, the vast ages of orderly progressive evolution are comprehended.

The real difficulty arises out of the fourth commandment—"Remember the Sabbath day to keep it holy. Six days shalt thou labour and do all thy work, But the seventh day

is the Sabbath of the Lord thy God. In it thou shalt not do any work, thou, nor thy son, nor thy daughter, nor thy man-servant, nor thy maid-servant, nor thy cattle, nor the stranger that is within thy gates. For in six days the Lord made heaven and earth, the sea, and all that in them is, and rested the seventh day; wherefore the Lord blessed the Sabbath day and hallowed it" (Exodus xx. 8-11). "In reading through the eleventh verse it is extremely difficult to believe that the seventh day is a long period, and the Sabbath day an ordinary day; that is, that the same word day should be used in such totally different senses in the same short sentence, and without explanation."[1]

This difficulty, fairly met, establishes the verity of the symbolism. The word "day" is not used in two different senses. As the day of toil to man, so is the day of the rest; and as the day of work to God, so is the day of repose. The true difficulty is—God never rested: creation is continuous, no break anywhere, processes now in operation perpetuate the primeval operation. God's life is all Sabbath and no Sabbath. Now, the Mosaic account implies a cessation and change in world-development, there not having been any such change; consequently, Gen. ii. 2, 3, is only ἀνθρωπινὸς λόγος, adapted to early unphilosophical conceptions. Human labour in producing, is a symbol of the Divine act in creating; man's repose is a figure of Godly rest. How long did it take God to create the world? Not so long in the Divine lifetime as a week is in man's lifetime. Grand as is the universe, vast as are its operations, many and various the inhabitants, the whole must be regarded by man as not so great a task to God as a week's work to himself. The days are all the same, and are all symbolical. Suppose that Moses meant — For six successive Divine days, in which moments are years, God's hand worked; on the seventh Divine day, not yet concluded (Heb. iv. 3-9), He began to rest. Let all holy men, as made in God's image, observe God's rule. Would not such a meaning add greatly to the force of the Divine command? In it is a moral measure for all time, and the key-note of providential arrangements. In it is a

[1] "Essays and Reviews," Mosaic Cosmogony: C. W. Goodwin, M.A.

peculiar majesty, specially suited to the growth of science; and the interpretation, now, affords proof of original inspiration. The sanctity and safety of the Sabbath are not shaken, but assured; built on truthful, not erroneous interpretation. We may not presumptuously take any day we please as a seventh of our time; the day was fixed, first, by Divine command; and, now, is settled by Scriptural example and Christian use. Our days, our weeks, our Sabbaths, our work, our rest, are made holy and linked to God. We may liken them to a ladder, set upon the earth, by which we climb to heaven. They are as a pathway across the territory of time; one end vanishes in the past to possess the antiquities of God, the other is lost in the great world-times of the future. The sacred week has not yet been measured by science, as to its duration; nor comprehended, as to its work; on the use we make of our own day in it depends our weal or woe in future life.

Our conclusion, as to the days' vast extent, receives support from two works lately published on chronology.[1] The writer shows that the Babylonians were acquainted with a solar period of 1460 years, and with a lunar period of 1805 years. The latter having been discovered by observation, not by calculation, some idea may be formed of the immense antiquity of Babylonian astronomy—already, even in the second millennium before the Christian era, familiar with those periods. The author states that the chronology, as found in the first eleven chapters of Genesis, is "original and unfalsified;" and agrees with the chronology of the corresponding periods of Chaldean tradition. As to the time occupied by creation, where the Bible reckons one hour, the Chaldeans computed 10,000 years. The 7 days, or 168 hours of the Bible, are the 168 myriads of years of the Chaldean historian, Berosus. In the antediluvian period, a Bible-week answers to 5 years, or a "Doss" of months in the Chaldean chronology: the proportion being as 23 to 6000, and 23 years including 1200 weeks. As the divisor 23 occurs three times in the chronology of the

[1] "Die Daten der Genesis:" Jules Oppert.—(From the "Nachrichten von der k. Gesellschaft der Wissenschaften zu Göttingen," No. 10, 1877). "Salomon et ses Successeurs:" Jules Oppert. Paris, Maissonneuve & Cie., 1877.

antediluvian patriarchs, so the divisor 6000 occurs three times in that of the Chaldean antediluvian kings. Whether or not further investigation will confirm the antiquity asserted by Jules Oppert remains to be seen. Our own argument has been worked out independently.

We are asked—"Why the larger interpretation, supposing it to be correct, was not earlier and forcibly given?" The reply is—The true interpretation may have been lost, as the Cheidean History was lost; or we may say—It would have been useless, men could not have understood it. Men, studying nature all these thousands of years, have not attained to a full knowledge of it; no wonder that they are imperfect in interpretation of Scripture. Philosophy has been many ages in progress, yet how little is that progress! We may be sure that a faultless interpretation of Scripture will not be inconsistent with a perfect knowledge of nature. The sacred language is not only for the mass of mankind—incapable of reasoning; but for those who are able to give a reason for the hope that is in them. God's Word abides in the same letter, while reason and science change their language, but it expands within its own limits for verification of the Divine origin, and for contentment of our emotional and intellectual requirements. No addition can be made by human ingenuity to the amount of revealed information; but—as we obtain deeper, wider, and more accurate knowledge, the Word of God and the Work of God are found to grow with our growth and to be in perfect accord. The Bible will never be left amongst the childish things which men put away; the vitality, elasticity, and comprehensiveness of meaning, answer all the requirements of life and knowledge; fresh truths are discovered, and hidden depths are continually revealed (Eph. i. 9, 10; Heb. xii. 27, 28; 1 Peter i. 25).

Changes, rightly made, vindicate, rather than impugn, the fact of divine inspiration; and out of the nettle, danger, pluck the flower, safety. To abide by the letter, yet find a larger meaning in it; to hold a natural fact, and see a spiritual reality; to discover that man's day is a microscopic miniature of God's day; is gain not loss. "Scripture cannot be broken." Men may obtain imperfect views; from various stand-points

take opposite aspects; and truth, being progressive, the knowledge of past and present generations is necessarily incomplete; but this establishes our position: the Book is a mystery, the origin is Divine, the diction is by Inspiration, the substance is of God. Men have been fearful, not fully knowing its depths. A half-civilised world explains it, the interpretation is erroneous; and the Mephistopheles of science rejoice. The unbeliever does not discern in it a mighty spiritual meaning. What of that? The circle of knowledge is extended, physical nature is proved to be God Almighty's material garment, and the unbeliever becomes faithful. Then, though the words of this Book remain the same, the fashion of their countenance is altered; and that which was suitable for the world's childhood, is a fit companion and consolation for its manhood. Theology, shouldered and jostled by the sturdy growths of modern thought, is becoming sturdier; conquering rude malicious opponents, and fascinating the intellectual. Theologians have been too patristic, too sectarian, and have not yet done with their schools; doubtless, the freer Theology of the future, if we are faithful, will move as by the Spirit of God on the face of the waters. Meanwhile Theology bids us follow Nature with unfaltering steps, and to study God's great works and processes for which no measurement nor computation can be found. There were days without sun, a formless abyss, light coming forth from darkness, sky clearing, firmament expanding, hills emerging, waters gathering, and life quickening.

"Oh! I know the hand that is guiding me,
Through the shadow to the light;
And I know that all betiding me
Is meted out aright.
I know that the thorny path I tread
Is ruled with a golden line;
And I know that the darker life's tangled thread,
The brighter the rich design." ANON.

Not unconscious of the argument against our earth's antiquity, drawn from the genealogies of Christ, a few reasons are appended to show that these genealogies do not historically fix the age of the world.

These genealogies prove that the computation of time

was attended to in early periods; but the variations show that chronology was always subordinate to the greater work of marking the line or family in which our Lord's birth was to be realised. Not even on this account were all the names preserved: for it was the practice of the Hebrews to omit names from their genealogies for moral and judicial reasons;[1] and in the times from the patriarchs down to Moses, or even to David, one name sometimes stands for a whole century in the genealogical series. The sojourn in Egypt of four hundred and thirty years has only the names of Levi, Kohath, Amram, Aaron, Eleazar, to correspond to it; and five of the tribe of Judah—Pharez, Hezron, Ram, Amminadab, and Nahshon. It was also the custom to repeat ancestral names generation after generation: the Pharaohs, Benhadads, Abimelechs of Gerar, show this. Definite round numbers were likewise chosen; for example, from the Patriarchs to David are ten generations (Ruth iv. 18-22); but we learn from other sources (1 Chron. vi. 1) that twenty-two generations existed between Levi and David. Ten generations fill up the interval from Noah's sons to Abram's father; and further back, from Adam to Noah (Gen. xi. 10-26, and v.). Sometimes grandsons and great-grandsons are counted sons (Mat. i. 8): Ozias (Uzziah) was three generations from Joram; Jechonias, son of Salathiel (Mat. i. 12), was really son of Neri (Luke iii. 27); Salathiel is called son of Zerubbabel (Mat. i. 12); but we are told (1 Chron. iii. 19) of a different son: Salathiel being Zerubbabel's grandson, by his daughter Shelomith. A founder's paternity extends, in fact, over all who derive their origin from him (Gen. xxxi. 28-43; 1 Chron. ii. 50, 51).

Both the Genealogies, by St Matthew and St Luke, are probably not only of Joseph, but also of Mary;[2] and if the Matthan of St Matthew is the same as the Matthan of St Luke, Jacob and Heli were own brothers. St Matthew reduces the seventeen generations, from David to the carrying away into Babylon, to fourteen: leaving out Ahaziah, Joash, and Amaziah, between Joram and Ozias;

[1] The New Testament, Luke iii. 31-38: Bishop Wordsworth.
[2] "Genealogies of our Lord," pp. 57-66: Lord Arthur Hervey.

and in order to make up the fourteen, from the captivity till Christ, Jeconiah has to be twice counted. In the genealogy of St Luke, from Adam to Abraham, Cainan is inserted between Sala and Arphaxad, in accordance with the LXX Version. The Hebrew makes Arphaxad to be aged thirty-five years at the birth of Salah; but the LXX states that Arphaxad was one hundred and thirty-five when he begat Cainan, and Cainan was one hundred and thirty when he begat Salah, and adds one hundred years to the ages of everyone of these—Salah, Eber, Peleg, Reu, Serug, and one hundred and fifty to Nahor. Indeed, the LXX adds one thousand four hundred and sixty-six years to the pre-Abrahamic period. Shem is put first of the sons of Noah, but was probably the youngest, and Japheth the eldest (Gen. x. 21; 1 Chron. xxvi. 10). St Paul says there were four hundred and fifty years of life-time for the judges, but only four generations are named—Salmon, Boaz, Obed, Jesse; yet for a similar period, from David to the manhood of Jehoichin, were nineteen or twenty-one generations. "No interpreter of Scripture, from the earliest times down to the present day, has ever been able to identify the ancestors of Christ, mentioned by St Matthew or St Luke, with any of the descendants of Zerubbabel, or other members of the house of David, whose names are recorded in the Old Testament."[1]

From B.C. 536 to B.C. 457, is only seventy-nine years; and yet six generations are named (1 Chron. iii. 17-24). In our copies of St Luke, there are seventy-six generations from Adam to Christ; but Irenæus speaks of seventy-two, Augustin made seventy-seven, a mystical number from which he extracted wonders. It is also significant that in the whole time from the entrance to Canaan till the birth of Samuel, a space of four hundred years, only three high priests are named: Eleazar, Phinehas, Eli.

These examples, which can be multiplied, suffice to show that names are used to bring us into contact with regions and epochs: are not accurate measures of time, but links to unite the old and ever-young humanity with God by means of Jesus Christ. Names, placed in symmetrical series; and

[1] "Genealogies of our Lord," p. 94: Lord Arthur Hervey.

numbers three, seven, ten, forty, reduced, or increased, or multiplied; are chosen with symbolical meaning. Indeed, at first there was no permanent chronological era even in common life. Facts were handed down, by memory and tradition, from father to son. As for Scripture, the words of every account extend to some great man—to the Patriarchs, to Noah, to Adam, thence to God. There are no ways of historically filling these gaps. Names actually and literally true, as applied to individuals, are also applied symbolically and collectively to the families, tribes, nations, by whom the earth was replenished. The conclusion we arrive at is, that chronology, in an exact and scientific sense, lies altogether outside of Revelation; and only exists in Holy Scripture for genealogical, not scientific purposes: hence, the charge of errors as to chronology are not to be regarded, are outside the scope of Scripture, do not affect those divine and spiritual truths which it is the object of Revelation to teach.

STUDY VIII.

DAY I.—LIGHT.

"Truth is the Body of God, and Light is His Shadow."—PLATO.

STELLAR Worlds existed before the earth. The poetry of Job (xxxviii. 7) is beautiful and true: when the foundations of the earth were laid, "the morning stars sang together, and all the sons of God shouted for joy." We adopt the words of St Jerome—"What eternities, what times, what originals of ages, must we not think there were before; in which angels, thrones, dominions, and the other powers served God; and existed apart from the changes and measures of times?"

"God said—'Let there be light:'
And forthwith light
Ethereal, first of things, quintessence pure,
Sprung from the deep."—*Paradise Lost.*

Light had shone long before in Heaven, and ancient stars had ere this been kindled. We believe this, though no scientific proof, so far as we know, exists that any fixed star or nebula is older than our sun. "Let light be," is the command. "There was light," is the substitution, on earth, of light for darkness. Light is a wave-like movement, a peculiar shivering motion, of the ultimate particles of bodies. The all-pervading æther takes up these molecular tremors, and conveys them with inconceivable swiftness to our organs of vision. This transported shiver of bodies, millions of miles distant, which awakes the splendour of day, and shines in the firmament at night, is, when translated into human consciousness, light. When we detect by a thermometer, or by the sensation that from which, as Locke says, we denominate the object "hot," that is heat; and when we become aware of it by the eye, it is called "light." "There

is no body in nature absolutely cold," says Professor Tyndall, "and every body not absolutely cold emits rays of heat." To render radiant heat visible, it must be raised to a certain temperature, when it emits a feeble red light; as heat grows, light augments in brilliancy, until, finally, it is dazzling white. "The difference between radiant heat and light is simply the difference between a low note and a high one."[1] If we conceive the universe as consisting of non-luminous, formless matter, and then, in scientific use of imagination, endeavour to realise the growing warmth of all things, as the vibrations of matter are quickened and intensified into the amplitude of luminous oscillations in the various series of worlds, we shall have some faint conception of God's wonderful work when He said—"Let there be light."

"Yet the sun
Was not, she in cloudy tabernacle
Sojourned the while."—*Paradise Lost.*

"Ignea convexi vis et sine pondere cœli
Emicuit, summaque locum sibi legit in arce."
OVID, *Met.* : Lib. i.

"Fire rose out of the formless mass, hung like a curtain on the roof, as it were, of the world; making light in the vaulted sky, and clothing it with a luminous vapour light." Or, more scientifically, "As in nebulous sphere, just become luminous, and in the new red hot liquid earth of our modern cosmogony, light was not yet divided into suns and stars, nor time into day and night."[2]

Let a current of electricity, of gradually increasing strength, be sent through a platinum wire; the particles of metal instantly vibrate with accelerating speed, and the wire becomes warm to the touch; but there is no light. At length, when the heat has grown, there is a faint red illumination. The glow augments with increasing heat, the red becomes more brilliant, orange rays are added; besides these appear yellow, then the green come, and in succession, blue, indigo, and violet rays. When the wire is white-hot, the simultaneous action of all the colours produces the effect or

[1] "Recent Advances in Physical Science:" Professor P. G. Tait.
[2] "Interaction of Natural Forces:" Professor Helmholtz.

impression of whiteness on the optic nerve, and the light is perfect or white.

We now, in some measure, have a conception of light going forth out of darkness. At whatever period, or in whatever manner, during the integration of our solar nebula into a planetary system, light began to shine, the heat would be the equivalent of the work of integration; and as the heat quickened in vibration, from the low to the high note, the brightness would increase—the energy of heat would be transformed more or less into that of light. If the whole mass of the earth was agglomerated almost at once, and if the different rent parts impinged together with properly arranged velocities, we can note the state of things before and after that moment. Before—were scattered masses of matter. Then, at the instant of impact, the integrated mass became of high temperature and light shone. Before that moment was darkness, after it was light. We cannot imagine that Moses, though learned in the wisdom of the Egyptians, knew this; or that the elementary atoms have their own shapes and powers, whereby they arrange themselves into molecules of exceeding complication and varying vibration; or could be aware that 458,000,000,000,000 vibrations in a second are necessary, in order to give us the consciousness of the lowest or red light; and we wonder that, in relating the primal illumination of the earth, he tells us first of the light, and after that of the luminous body—the sun. With higher reverence than any regard for his own wisdom draws forth, we meditate on the words—"The earth was without form and void; and darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters. And God said, Let there be light: and there was light."

That which caused the integration of the earth, and the production of light and heat, was energy. Energy may be defined as the power of doing work. There is always a tendency, in every transformation of energy, to pass from a higher to a lower form; indeed, all the energy in the universe is passing on to the lowest and final form of equally diffused heat. This, the dissipation of energy, is by no

means well understood. There can be little question that the principle concerns the whole theory of thermo-electricity, of chemical combination, of allotropy, of fluorescence, &c., and perhaps matters of a higher order than common physics and chemistry. In astronomy, it shows us the material of potential suns, suns in the process of formation, in vigorous youth, in the phase of habitation for life, and in every stage of lingering decay. It reveals to us every planet and satellite as formerly a tiny sun. It carries forward our thought to that time when the materials of present systems shall be component parts of future larger suns and planets. Finally, it conducts us to that necessary future, if physical laws remain unchanged, when the present warm glittering show of life will be dark and cold and dead. It also reminds us of a beginning, a state beyond which we are totally unable to penetrate, a state produced by other than now visibly acting causes, by that transfer of energy from the Unknown, of which the universe and all material phenomena are memorials.

The elementary atoms, possessing their own shapes and powers, arrange themselves into molecules of manifold combination, and exceeding variety of vibrations. When raised to incandescence, or white-heat, and their lights are tested by spectrum analysis, the glowing vapours indicate, by luminous lines, the different elements which are in combustion: thus we are learning of what materials the sun and stars are composed.

Heat and light are the product of a transfer of energy. Transfer of energy, through a solid body, is effected simply by vibration of the solid body; through air, by setting it in motion at its own period of vibration; through what we call a vacuum, by the magnetic medium—that which Clerk-Maxwell gives reason to believe is the medium which conveys light and radiant heat. Vibrations, occurring less frequently than sixteen times in a second, produce in us consciousness of a succession of noises. Vibrations occurring oftener than 16, but less than 30,000 times in a second, produce in us the consciousness of musical notes, varying in pitch with the vibrations. Vibrations occurring oftener than 30,000, but less than 458,000,000,000,000 times in a second, do not

affect us through the ears; but the more rapid ones, acting through the nerves of the skin, produce in us the consciousness of heat. Vibrations at the rate of 458,000,000,000,000 in a second, affect us through the eyes, and produce our consciousness of red light. As the vibrations increase, corresponding shades of colour appear, until, at the rate of 727,000,000,000,000 in a second, we have the consciousness of violet light. Higher rates produce no definite state of consciousness in us. Thus, by one and the same external agency—vibrations among particles of matter—are sensations caused different, as sound, heat, light.

In sound-waves, the particles of air vibrate back and forward in the direction travelled by the sound. If, by another sound, we raise such undulations as fill the depressions in the waves of the former sound, this adding of sound to sound will cause silence. Light and heat travel at the rate of about 186,000 miles a second, the direction of the vibrations is across the direction in which they move, two sets of rays may be made so to interfere with one another, as to be mutually destructive: the two rays of light produce darkness, and the two rays of heat cause heat to disappear.[1] Passing a slice of solar or of electric light through a prism, we unroll it into the beautiful colours of the spectrum. At one end is the red, at the other the violet, the remaining prismatic colours lying between. Red is hottest of the colours, and beyond it are the invisible rays called heat rays. Violet is the coldest, and beyond it are the actinic or chemical rays, also invisible. In the three, heat, light, actinism, reside the miraculous generative energy, which fills the earth with warmth, life, and splendour. Concerning their nature, whether we call it vibration, or heat, or light, or actinism, we affirm nothing, and know nothing. Aristotle, one of the most thoughtful men, would say—the energy streamed from God, the Infinite and Eternal Mind, as light issues from the sun.

To a certain extent, we can give a mechanical explanation of heat and light, as the products presented to our consciousness of a perpetual trembling, or swaying to and fro, of the invisible atoms of which visible bodies are composed; but,

[1] "Recent Advances in Physical Science," p. 205: Professor P. G. Tait.

when the explanation is connected with the linked purpose of the whole, we are conscious of wisdom and might exceeding all our thought. Light, wonderful and mysterious, is but a single point in the vast scheme of nature. It is passed through æther, by means of transversal disturbances or vibrations. When we contemplate the heavens some clear autumnal evening, and marvel at the beauty of Sirius, that starry splendour is brought to us by medium of atomic shivers maintained, during the past twenty-two years, at the average rate of six hundred millions of miles the second; and reveals a scheme of worlds and possible sphere of life, vaster than our own. Nor is that all; several optical phenomena indicate that a disturbance partaking, if such be possible, of the nature of compression would be transmitted with a velocity almost infinitely great in comparison with the existing velocity. We may ascend by this thought to the possible nature of the means, by which intelligence is conveyed to other beings of the things that are done in the world.

The medium actually used, æther, is specially fitted for the transmission of the small waves which constitute light. These waves are so small, that from forty to fifty thousand are required to occupy the breadth of an inch, and trillions enter the eye during a few seconds. The red wave has a length the $\frac{1}{39000}$th part of an inch. In one second 458,000,000 of vibrations occur. At the line H, in the violet, the length of the wave is $\frac{1}{57000}$th part of an inch; and the number of vibrations is 727,000,000 the second.[1] The optic nerve is not conscious of the heat in the hot rays, nor of waves larger than the red, nor of those smaller than the violet. The eye is only able to see different proportions of the three primaries—red, green, violet; therefore, our sight may be fairly considered as rudimentary. "Take the number of fibres in the optic nerves as two hundred and fifty thousand. Every one of these is capable of innumerable different degrees of sensation of one, two, or three primary colours."[2] What a manifold undeveloped system of signs and images we have within us!

[1] "Spectrum Analysis," p. 11: Henry E. Roscoe.
[2] "The Perception of Sight:" Prof. Helmholtz.

In all creatures the eye is a wonderful instrument; but, probably, the eyes of insects excite highest admiration. On the heads of beetles, bees, flies, butterflies, and other insects, are two protuberances; these, examined by the microscope, are found to contain a prodigious number of small transparent hemispheres, placed with the utmost regularity in lines crossing one another as lattice work. These hemispheres are eyes which, like so many mirrors, reflect the images of surrounding objects. Some insects possess thousands. A manifold infinite adaptation of means is thus unfolded for contemplation.

We know what a language of twenty-six letters does in collecting, preserving, and enabling us to verify the experiences of millions of men in thousands of generations; but all this seems nothing in comparison with light which brings revelations from star-depths, and which even our present optic nerves, when all developed into use, may translate into human consciousness distinct physical images of operations wrought by the ministers of flame, the guardian spirits, the cherubim and seraphim, continually teaching new lessons of the Almighty's operation. We may be able to see waves of radiance, at the rate of six hundred millions of millions the second, impart their motor energy to the atoms which vibrate in unison in the molecules of growing grass and flower; and behold how these are arranged by tremendous chemical energy into their substance and tissues; so that grass and flower, adorning the earth, bird and beast and man, filling the world with life, are metamorphosed beams of light. Who is he that will not worship the invisible God, whose visible garment is this glorious web of material phenomena?

> "Well hast Thou taught the way that might direct
> Our knowledge, and the scale of nature set
> From centre to circumference; whereon,
> In contemplation of created things,
> By steps we may ascend to God." PARADISE LOST.

Every kind of light is not equally suitable for vegetation. Lamp-light, gas, and petroleum-light, are poor in chemical rays. The white Bengal light of arsenic, the flames of the blue Bengal light, and of burning sulphur, produce a more

powerful chemical effect; but in photographic power are surpassed by lime, magnesium, and electric lights; the most important light, in every respect, is sunlight.

The pure earths, when violently heated, yield from their surfaces lights of extraordinary splendour. "We have pretty good reason to believe, that probably all the planets emit light in some degree; for the illumination which remains in the moon in a total eclipse cannot be ascribed entirely to the light which may reach it by the refraction of the earth's atmosphere."[1] Humboldt, in his Cosmos, writes—"The earth becomes self-luminous; besides the light which, as a planet, it receives from the central body, it shows a capacity of sustaining a luminous process proper to itself." The words of Schubert are very beautiful—"What if every proper polar light, which we call the Aurora of the North, were the last glimmer of a twilight of a world-day that has set, when the whole earth was surrounded by an expanse of air, from which the electro-magnetic forces radiated light in a much greater degree than that of the polar light, and at the same time with animating heat, in a manner almost similar to what still occurs in the luminous atmosphere of the sun."[2]

It is not light only which produces the sensation of brightness. The weakest electrical currents passed through the eye produce consciousness in the mind of flashes of light. A blow, or pressure on the side of the eye-ball with a finger, gives an impression of light. Fevers, contamination by narcotic or intoxicating drugs, by causing increased pressure of blood, excite sensations of light. Even when the eye has been destroyed, irritation of the stumps of the optic nerve produces like sensations.

The peculiarities which separate the sensation of light from all others do not depend upon any peculiar qualities of light itself; the working power of nature is something in and yet beyond us. While moving silently in the chambers of our consciousness, it heats the atmosphere, produces the winds, and thereby shakes the ocean; it gives life to forest and field, to cattle on a thousand hills, and reveals to man the wonderful

[1] "The Sun," R. A. Proctor, quoted from Sir Wm. Herschell.
[2] Quoted in "Kurtz's History of the Old Covenant."

works of God. In human affairs, ars est celare artem, greater skill conceals the art; and Moses, when he made known the fact that light preceded the luminary, and began that marvellous work which the sun had appointment to rule and perfect, was guided by a higher wisdom than is common to man. An experiment may illustrate this. Converge the rays of an electric light by means of a concave mirror. Place between the luminous focus and the source of rays a solution of iodine in bisulphide of carbon. Now the light is cut away, but the dark hot rays are still there; try—your hand cannot endure even for a moment the intense heat. At this focus you may burn all that is burnable, and that which cannot be burned raise to white heat and light. At the opposite end of the spectrum, the invisible cold ultra violet rays may have their refrangibility lowered and become visible. Thus beautiful colours shine visibly forth, and light is extracted from darkness to discourse in harmonious tongues of musical flame. "Day unto day uttereth speech, and night unto night showeth knowledge."

The creative architectural beautifying and vivifying process in our earth began with that wonderful going-forth of energy by whose operation light sparkled into existence. This statement is not too scientific for Scripture, though Scripture is no teacher of science. We are not would-be discoverers in Bible language of latent physical systems, but endeavour to "bring forth things new and old." "If any one were to suggest that the nebular hypothesis countenances the Scripture statement as to light, by showing how the luminous matter of the sun might exist previous to the sun itself, we should act wisely in rejecting such an attempt to weave together two heterogeneous threads; the one a part of a providential scheme, the other a fragment of a spiritual speculation."[1] Despite this, if Scripture is assailed by perversion of science, we are warranted in the use of scientific weapons for defence. If, with the growth of science, our ideas and knowledge of nature are enlarged; so is it the crown and glory of Scripture to reveal deeper depths of meaning in the recesses of sacred language as they are searched with clearer, purer light. "I think it to

[1] "Philosophy of the Inductive Sciences:" Wm. Whewell, D.D.

be the character of Holy Scripture (as it is in a measure of all deep sayings, even though human) that it contains much more than at first sight appears; that it requires to be searched into, i.e., below the surface; that it yields mines of treasure when so searched, which those who are content to remain on the surface do not see."[1] We rightly refuse explanations—fashioned by ignorance, scorn concessions, prompted by cowardice, and rebuke those whose defences are rather surrenders than vindications of sacred mysteries. The Bible speaks with words that live for ever, and utters truths which only ages of advanced intelligence can fully understand; artless for the childhood of our race, and in highest style of wisdom, for those who are great in truth.

In stating the scientific aspects and explanations of light, we not only aim at vindicating the accuracy of the Mosaic account, but convey other lessons. In those simple but grand words,—"Let light be and light was," we have in briefest form the most comprehensive expression of Almighty Power working according to Infinite Wisdom. Light stands at the summit of things, so subtle, so delicate, almost supersensuous, as were it a link between spirit and matter. A creature, shall we say, of infinite extent, of unsurpassed beauty, entering all worlds and passing beyond all worlds, itself unseen yet revealing all things, being a revelation of the works as Holy Scripture is a revelation of the thoughts of God? Light, alone among all the divine workings and products of nature, is found worthy to symbolise the Divine Being Himself. In it we have deep and real analogies of the seen and the unseen; and in it, as an unspotted mirror, we behold the image of God's goodness; light is revelation.

It is time for all who would live the higher life, to learn that contemptuous negation of Scripture—that other Revelation, is not wise nor safe. Men of faith are supplementing faith by knowledge. Men of science must add faith to knowledge. Before fighting as to the colour of a shield, both should regard the other side. The two hemispheres of faith and knowledge unite in the full orb of a perfect life. The faith that listens and obeys, ennobles the science that greatly

[1] "Daniel the Prophet," Intr. p. lxxv.: Dr Pusey.

achieves. The physicist, as physicist, can know nothing concerning the true doctrine of Holy Trinity; nor can the chemist, as chemist, solve the salutary doctrine of redemption; these sacred verities are the other side, the spiritual view of things, which the natural man cannot discern so long as he will only see the near and physical. The perfect man possesses that scientific mind and that religious mind which, as two eyes of the soul, view both aspects of the universe. As an accurate thinker of widest range, his piety, chastened by actual knowledge of nature; and his science, elevated by more and more discernment of the spiritual in the secular; he is prepared to dwell in everlasting mansions with Him whose visible garment is the beautiful life and glowing splendour of many worlds.

Shall we, whom religion and science unite to teach that creation is extending dominion over chaos, use light only to photograph Egyptian sepulchres? Shall we, while carrying it into subterranean depths, forget that spiritual phenomena are also a definite part of the organic manifestation? Are all high things explained by the lower? or, rather, shall the lower find true meaning in the higher? Space exists for matter, matter for life, life for spirit; is there no existence, no life, apart from matter? May there not be intelligences existing neither in space, nor out of space, but with eternity as home? Are not space and time two sides of the ladder, whose rungs are those grades of infinite organisms, those ascents of life, those elevations of human soul, by which intelligence travels up to heaven, and above heaven unto God? Holy Scripture speaks of angels, of archangels, and of bright abodes for the spirits of just men made perfect. Why not believe it all? Some maligners of Scripture seem to have lost all that divine magnetism by which the good and true are drawn heavenward? Are we, who possess it, to deny the blessed influence? If the internal structure of an atheist's mind, has, by continual denial of the Divine Spirit, become wholly material and sensual; shall we account the churl liberal, the unbeliever devout, and declare that we also are nothing but atomic arrangements containing certain mixed gases? Some critics call Shakespeare a wild genius without arrangement. Truer

critics find that he is an artist of first order and accuracy; ever rising to that height which, as he cannot be followed by the feeble, nor the ascent be seen by the dim, is by them counted mystic and unreal. These are the men who find the Bible a common book, and complain of every part. What matter? despite wit and malice, perversion of learning and wickedness of unbelief, it guides the intellect and cheers the heart of the greatest of our race. It is the light of truth sent out by the Almighty to lead them, and bring them into His holy hill.

. . "Fainting soul arise and sing;
Mount, but be sober on the wing;
Mount up, for Heaven is won by prayer;
Be sober, for thou art not there.

Thy God hath said, 'Tis good for thee
To walk by faith, and not by sight;'
Take it on trust a little while.
Soon shalt thou read the mystery right
In the full sunshine of his smile." KEBLE.

STUDY IX.

DAY II.—"GOD MADE THE FIRMAMENT."

" Was wär' ein Gott der nur von aussen stiesse,
Im kreis das all am Finger laufen liesse !
Ihm ziemts', die Welt im Innern zu bewegen,
Natur in sich, sich in Natur, zu hegen.
So dass was in Ihm lebt und webt und ist
Nie seine Kraft, nie seinen Geist vermisst."

GOETHE.

"Thus saith the high and lofty One that inhabiteth eternity, whose name is Holy, I dwell in the high and holy place, with him also that is of a contrite and humble spirit, to revive the spirit of the humble, and to revive the heart of the contrite ones." ISAIAH.

THE second day's work was not praised for being good. We know not why, unless the work, being imperfect as to the earth until the third day, and not complete as to heaven till the fourth day, the blessing waited for the delicately formed plant and the cheerful sun, when it would be well seen that God filled the earth with the fruit of His works, and covered Himself with light as with a garment.

The sacred narrative of the earth's early state would naturally have that meaning applied to it by early and unscientific men, which the appearance of things suggested. Being told of a firmament dividing the waters above from the waters below, they possibly thought of a transparent floor in the skies, on which the upper waters rested, and may have pictured "the earth standing in the centre of a hollow crystal sphere, in which the stars were fixed like golden nails;" but observation and reason soon showed that rain could not descend through such a floor, and that the waters above the firmament were, as St Augustine thought, in a state of vapour. Even a rustic would not think that the sky was a solid vault, nor call the stars bright nails fixed in to hold it up. The Hebrew people saw birds soar aloft, and the moon cross the

sky; the intelligent knew of the connection between cloud and rain; none but the dullest would imagine that the sky was solid.

The phrases "windows of heaven" (Gen. vii. 11), "foundations" (2 Sam. xxii. 8), "pillars" (Job xxxi. 11), "doors" (Ps. lxxviii. 23), have led unpoetic persons to imagine that Moses and the Hebrews really did think of the firmament as a solid vault in which fowls fly and winds blow. The ancient sages were not so simple. These poetic expressions, and others like that of Job (xxxvii. 18), "The sky, which is strong, and as a molten looking-glass," are sometimes a contrast, sometimes a comparison. Job meant that the sky, though rare, fine, and spread out, is established and strong as metal. Ancient worthies had a better understanding of things than our modern conceit gives them credit for. They knew that the earth was hung upon nothing (Job xxvi. 7), and when they spoke of it as firm and not to be moved, it was in the sense of being sustained by the Almighty. They knew of the sea as a fountain to water the whole earth (Amos ix. 6); of the rivers returning to it again (Eccl. i. 7); of the firmament as an expanse; of light existing apart from the sun; and of stars innumerable, or, as an astronomer would say, "Like grains of sand on the sea shore." They accounted the present as but a momentary space in the interval between two eternities, earning blessings or cursings for ever, according to man's efforts to do good and hate evil. They thought of the future as a home of rest from evil, a place of everlasting beauty, in which the whole creation should praise God. They saw living things and men in a vast procession, not urged by blind force, but guided by Divine Intelligence to higher activities and more glorious spheres.

The knowledge of ancient sages was indeed wonderful; it often pierced the outward form and natural aspect of things to discern their inner meaning and power. Inspired men regarded God as the One who bound up the thick clouds with strength, that the waters might not rend them (Job xxxvi. 8); who apportioned the atmosphere, made a balance for the winds, a decree for the rain, and a path for the lightning (Job xxviii. 24-27). Solomon, moreover, or whosoever it was that

wrote in his name, had understanding of the wind going toward the south, the turning about unto the north, and why the fulness of the sea was not over-fulness (Eccl. i. 6, 7). Science, since those old-world days, has weighed the wind, traced its path, and found that it turneth about to the north, whirling in continual currents. We know now that an atmospheric pressure of fifteen tons is on every man, and that, if it were not so, our lungs could not well use the air. It is a physical fact, that the air, by a secret process, raises and suspends water, eight hundred times heavier than itself; and in quantity so vast that if it descended at once upon the earth, the world would be deluged; and by ascent so graduated that the earth be not unduly parched, nor animal and vegetable destroyed. Those ancients were not ignorants, and, great as is the advance of modern science, no man has exceeded Solomon in wisdom, or Job in patience, or convinced Moses of folly for saying, "God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament."

The genius of ancient worthies was not less marvellous than their knowledge. There were sparkles of spirit and gleams of genius which remind us of, while they surpass, the best and purest portions of the classic page. As a literary production, there is nothing in any ancient or modern book that equals in simplicity, or beauty, or grandeur, the account by Moses of creation. The Book of Job cannot be styled less than perfect; the Psalms are matchless; Isaiah is often sublime. The whole Bible remains ever fresh by the life that is in it; creates new interest in men of every age, not only by the letter, but specially by the spirit; for it is adapted to the various stages of history, and illustrates the great principles of moral government. It possesses a wider influence than when originally spoken, and the charm of novelty as were it newly found. It is rendered more romantic than the romance thrown into it by Divinity of origin, through the sacred, subduing sadness which pervades it; and the high art of embalming the spirit, the thought, the laws, the life of a whole nation. The words of graceful imagery with which patriarchs and prophets describe God and His works, and the ruin of beauty and glory by sin,

are in the power of true poet-artists. Sometimes its form of language is child-like, and the figures express our commonest notions; but that outward body and form so take hold of our life as to win homage and love from the purest and wisest of mankind. The representation of perfection and beauty in Divinity is entrancing, and our delight deepens into awe. Sacred anger is aroused while, as before our very eyes, a malignant hand, by a few wickedly skilful, dark strokes, turns favour into disfavour, so that the purpose of God and the image of man are distorted and defaced. The two hemispheres of representation—Divine holiness and Satanic iniquity—are then separated by a firmament of mercy. Beneath that firmament are forgiveness and sanctification; above that firmament, ascending to the height, are promises of regeneration to the earth, and of glorification to men—the likeness of a throne, and upon the likeness of the throne as the appearance of a man (Ezek. i. 26.)

"Aye, gloriously thou standest there,
Beautiful, boundless firmament!
That swelling wide o'er earth and air,
And round the horizon bent,
With thy bright vault and sapphire wall,
Dost overhang and circle all."

WILLIAM CULLEN BRYANT.

Beware of regarding the primeval waters as existing in their present state. They were full of mineral and earthy ingredients, surcharged with gaseous elements; rather a molten mass of fluid and gaseous condition than water, as seen now, cooled down and formed by the chemical affinity of oxygen and hydrogen. Thick steam, arising from this heated water and the other matters held in solution, rendered the circumference of the earth moist and cloudy. By some inscrutable operation, vapours and gaseous elements were more and more separated and differentiated from mineral parts—made to rise out of the water, and expanded to become constituents of the present life-sustaining atmosphere. Whatever it was, there seems to have been a power which decomposed the fluid matter, or water, and formed the atmosphere which evaporated the surplus vapour,—a power of attraction and contraction on one hand, a power of repulsion and expansion on the

other. This power, by a peculiar law, the diffusion principle, abstracted the elements of the firmament from submission to the universal law of gravity, and enabled the watery vapour to penetrate it with perfect freedom, and become a well-spring of life in the atmospheric streams surrounding our earth.

The words "Let there be a firmament in the midst of the waters, and let it divide the waters from the waters," express the relative degrees of expansion. Those under the firmament are of less expansive principle, being below what is called "Dew-point;" and those above the firmament, being of more subtle or higher expansive principle, incline to ascend. Thus a division, ever varying in extent and degree, is established by means of the atmosphere.

If the sun was so far conditioned as to shine out beyond his own vapours; the hypothesis is that earth-clouds excluded the light from our own planet, and covered the surface of the deep with gloomy obscurity, like that of evening and early morn. Our earth, with this robe of vapour, and earlier separated from the original mass than were Venus and Mercury, would probably, to a distant beholder, seem to have fleecy, shifting, dissolving bands, dense masses of clouds driven of winds and tossed, such as we now behold by telescopic examination of the planet Jupiter. This great planet is encircled by similar great cloud-belts, such as the sun is incompetent to raise. Cloud-layer upon cloud-layer cover the seething surface of that far-off world, which appears to be passing through those stages which marked the earth's early course; and small as is the visible sun there, the skies seem in formation by the establishment of a firmament like our own, to divide the waters which are under the firmament from the waters which are above the firmament.

This may be expressed in another form. The firmament is not strictly the air itself, still less a solid vault, falsely conceived to exist, but that visible hemisphere of sky which encloses the earth and sea. We ought never to depart from the optical view in explaining the sacred narrative, but that view must be explained and enlarged by an instructed intellect. Intellect tells us, "Were the matter of the universe

cast in cold detached fragments into space, and there abandoned to the mutual gravitation of its own parts, the collision of the fragments would in the end produce the fires of the stars."[1] This separating of materials, then the gathering of meteoric masses into centres of conflagration, give us one star differing from another star, and the firmamental expanse. Further, we are told that "the planets exterior to Mars, Jupiter, and Saturn, especially the best known of them, appear to be spheres of water and of aqueous vapour, combined, it may be, with atmospheric air. . . . It was agreeable to the general scheme that the excess of water and vapour should be packed into rotating masses, such as are Jupiter and Saturn, Uranus and Neptune. . . . Thus the vapour which otherwise would have wandered loose about the atmosphere, was neatly wound into balls, which again were kept in their due place by being made to revolve in nearly circular orbits about the sun."[2] The scientific theory is, and it can be no more than theory, that our earth, with a robe of vapour around, seems to have had formed a sensible expanse, or middle region of clearer atmosphere, separating the waters depositing below from those drawn upward; and transferring, yet containing the sea of mist, by passing it into pure invisible vapour. The Lord bound up the waters in the thick cloud (Job xxvi. 8), in His discretion stretched out the heavens (Gen. x. 12), caused the vapours to ascend from the ends of the earth, made lightnings for the rain, and brought the wind out of His treasures (Ps. cxxxv. 7).

"Divide the waters from the waters." "The clouds are, in Scripture metaphor, the bottles of heaven. They are the instruments by which, when the windows of heaven are opened, some of the waters above the firmament are transferred from their celestial reservoir, and descend in showers to rejoin, by the springs and rivers, the gathering of the waters in seas below the firmament."[3] Mists and clouds are formed, so far as we can judge at present, of a multitude of hollow vesicles with exceedingly thin covering. These

[1] "The Constitution of Nature:" Prof. Tyndall.
[2] "Theory of the Solar System:" Dr Whewell.
[3] "The Bible and Modern Thought:" Notes, Rev. T. R. Birks.

vesicles vary from 1·4222 to 1·2620 of an inch in diameter. The aërial body of the atmosphere is of distinct and separate character from the vaporous portion which is contained within its interstices. By the formation of clouds, their elevation into the air, their easy and rapid movement by means of the atmosphere, the earth is refreshed with dew and moistened with water; while, by pressure of the very atmosphere into which moisture is raised, the too quick evaporation of liquids and the dispersion of many solids are prevented. It has been ever the same during historic time, for the air contained in a jar, buried at the destruction of Pompeii, was like that now covering the earth; the breezes of Africa, wind on the lofty Alps, and the atmosphere of England, are of uniform constitution. Bearing the breath of life to animals, and nourishment to plants, it is a faithful conservatory of blessings—

> "The earth waxeth proud withal
> For sweet dews that on it fall." CHAUCER.

If, in popular conception of the firmament, we take it as the sensible limit between the visible and invisible; then all water visible to the senses, whether in the seas or in the clouds, is described as under the firmament; and all that which is invisible or concealed from the senses is stated to be above the firmament. Out of this state of invisibility the rain appears to fertilize the earth. This is opening the windows of heaven, pouring out of the bottles, the descent of the waters from above the firmament to mingle with those below. If we stand and look into the azure of the sky, when the clouds seem to give out their evaporation; or consider the rain descending through bands of light; we discern a fulness in the words, "God made the firmament, and divided the waters," to which modern art cannot add.

The operations by which the firmament was formed, the waters were gathered, and the dry land upheaved, prove that the sun was already in existence, and exerting those mighty energies by which, in conjunction with earth-powers, land, sea, and air became beautiful abodes of life. We may now, from arrangements by means of which sunlight pierced to the earth and became beneficial, ascend to the phenomena of light

as affecting our firmament. Tracing up light high as we can to its source, we arrive at particles of matter vibrating as the particles of a tuning-fork vibrate to produce sound. The waves differ in size, form, and energy. All larger than the red, all smaller than the violet, are incompetent to excite vision. Of those exciting vision, the largest may be of ten-thousand-fold more energy than those of the smallest; of all the waves, visual and non-visual, a million-fold. They meet different degrees of hindrance on passing into refracting substances, indeed are actually pulled asunder when sent through a refracting prism, and pure unsifted white light separates into an infinity of colours, but our sight is limited to seven, called prismatic, red, orange, yellow, green, blue, indigo, violet. The waves, impinging on ordinary clouds, are divided into a reflected part and a transmitted part: when they pass from light air into dense, or from dense air into light, a portion of the wave-motion is always reflected, and the reflected light is the light of our firmament. This light is blue, because the blue is reflected; the orange and red are transmitted, or break through, being more forcible; the others are scattered, and blue is the chief colour of scattered light. The transmitted light, that which comes to us, appears yellowish when short distances are traversed; but, as the sun descends toward the horizon, the atmospheric distance increases, and violet, indigo, blue, and a portion of the green, are abstracted in succession; and the firmament colours from yellow to orange, and through orange to red. Thus we have, at noon, deep azure; and at sunset, the warm crimson glow, hung as a curtain between our earth and the black height of infinite space.

We can generate artificial skies by means of vapours. Those vapours are aggregates of molecules of matter, and every molecule is an aggregate of atoms; a molecule of aqueous vapour being two atoms of hydrogen and one of oxygen; a molecule of sulphurous acid being one atom of sulphur and two of oxygen; a molecule of ammonia being three atoms of hydrogen and one of nitrogen. They have motions of their own as wholes, and the atoms have motions of their own as parts, and the atoms approach one another

or recede, as the separating forces are overcome, cease to act, or acquire force. They cannot altogether part company because, besides the repulsive, there is an attractive force; and the position of equilibrium is that point at which attraction and repulsion are equal to one another. Take a glass tube filled with sulphurous acid gas, place it in a dark room, send through it a powerful beam of light; the vessel seems empty as a vacuum, but soon a beautiful sky-blue colour is seen along the track of the beam. Various other colourless substances, of the most different properties, optical and chemical, may be experimented upon to produce the blue of the sky, luminous clouds, and splendid iridescences.

These colours are produced by the shining of light upon matter. Space, traversed by rays from all suns and stars, is itself unseen; and the æther which fills that space, and by its motions lights up the universe, is invisible. "Colour depends solely upon the rate of the oscillations of the particles of the luminous body, red light being produced by one rate, blue light by a much quicker rate, and the colours between red and blue by the intermediate rates."[1] Take a tube containing air and amyl vapour. They are both invisible. Converge the rays of an electric lamp to a focus in the middle of the tube. For an instant it is dark, but quickly the beam darts through a luminous white cloud, the molecules of the nitrite of amyl are shaken asunder, there is a shower of liquid particles, and the flash is like "a solid luminous spear." This separation, or breaking up, is effected by exciting differential motions among the atoms, and the motions are introduced by the shock of the waves from the lamp. The waves most effectual in shaking asunder compound molecules are not the red and the ultra-red, but those of least mechanical power, the violet and ultra-violet. They are probably millions of times less than the ultra-red waves, yet the great are powerless and the less are potent. Sky-matter, or matter in the skyey condition, which we are now acquainted with, the basis of light, consists of particles so infinitesimal that the bewildering vastness of the distances in stellar space has here to be reversed; by no possible exertion of our present faculties can we picture

[1] "Chemical Rays and the Structure and Light of the Sky:" Prof. Tyndall.

the ultimate atom. Sir John Herschel calculated that the matter composing the tail of a comet 100,000,000 of miles in length and 50,000 miles in diameter, would do little more than fill a wheel-barrow; and, as to all the matter in our firmament, Professor Tyndall says, "I have sometimes thought that a lady's portmanteau would contain it all. I have thought that even a gentleman's portmanteau—possibly his snuff-box —might take it in."

Æther-waves untie the bond of chemical affinity by striking against and breaking up gaseous and other molecules; in some cases yield up their motion to these molecules, in others glide round them, or pass through the inter-molecular spaces without apparent hindrance. Those waves of æther are copiously absorbed which synchronise with the periods of the molecules amongst which they pass, and those are most copiously transmitted which do not synchronise. Transparency is due to inability to absorb luminous rays. Snow and ice are not dissolved by sunshine, but by the warm dark rays which are not luminous at all. The elementary gases, oxygen, hydrogen, nitrogen, and the mixture of atmospheric air, are practical vacua to the waves of heat. The experiments on permanent gases have been extended to the vapours of volatile liquids, which also possess different powers of intercepting calorific rays. Perfumes, diffused in the air, though their attenuation is almost infinite, produce a similar effect. Patchouli scent takes up thirty times the quantity of heat intercepted by the atmospheric air which carries it. Patchouli acts more feebly on radiant heat than does any other perfume yet examined. These perfumes of Scripture absorb most: cassia, 109 times; spikenard, 355; aniseed, 372. The vapour of water is the most powerful absorber of radiant heat hitherto discovered. This vapour is almost infinitesimal in amount, 99½ out of every 100 parts of the atmosphere consisting of oxygen and nitrogen; yet this vapour exerts from 100 to 200 times the action of the whole body of air, and is of the utmost consequence to the life of the world. It takes up the heat waves, becomes warm, and then enwraps the earth as with a garment to maintain warmth, and, at same time, to exclude scorching heat. Earth-rays not being of power equal to those of the

sun, are unable to pierce this vapour and escape into space, so that, in consequence of this difference in action, the mean temperature of our planet is higher than is due to its distance from the sun. That is not all. The waves of æther, acting upon the molecules of matter in the firmament, break them up by giving their own motions to the component atoms,—that is these atoms, or some of them, begin to synchronise with the vibrations of the infringing æther, and the rates of motion being made to vary, the molecules are decomposed. By this operation, carbonic acid gas, contained in the air, is fitted to become food for the vegetable world. The leaves of plants absorb the gas, and when in the leaves, the incipient loosening of the molecules by the action of light enables the leaf to seize upon and appropriate the carbon, while the oxygen is discharged into the atmosphere.

Leaving out details as to the polarisation of light, it is evident that the firmament contains a marvellous and harmonious co-operation of phenomena, but of so vast a nature that we cannot unravel the whole mystery. Because we cannot unravel the mystery—and how should we, seeing that creative design, if there is design, must extend to the whole of nature—our assertion that wherever we find marks of purpose and contrivance, there must be corresponding will and design, is met by the humorous reply, "If there be pepper in the soup, there must be pepper in the cook who made it, since otherwise the pepper would be without a cause." Mr Mill was, we think, the author of this combination of salt, pepper, and soup, to puzzle our intellectual co-ordination of experiences. When, by a play upon words, we are required to assume that God must be partly of iron and partly of clay, seeing that they are in the universe; otherwise we have no right to say, "the Supreme is wise," because there are marks of will and contrivance in the world; the ingenuity of our opponents must be pushed to the furthest limits. Surely motion is a manifestation of energy; the causes of visible appearances are not the appearances themselves; nor is law an agent or agency by which substances are coerced, but an abstract expression of the series of positions which substances assume under given conditions. We are willing to interpret law as the order of sequence. In so doing

we refuse to allow that the Eternal Power, of whom the web of phenomena is a visible garment, is to be degraded into a necessary order, or fate, or a physical property, or mere strand in the web of phenomena. He is the Infinite and Inscrutable God; not an intelligence circumscribed, adapting its own internal processes to other processes going on externally; but a Spirit to whom we as correctly attribute the wisdom as we do the energy displayed in the universe.

The arguments generally used to divest the Infinite and Eternal of wisdom and will, do, when applied in a like manner, unclothe all human conduct from volition and intelligence. For example, take the President of the British Association, assembled at Belfast in the year 1874, as a reasonable being. Why? For no other reason, though some doubt, than that he behaved *as if* he were reasonable. The president of 1874 used the playful illustration in reference to the president of 1870. Even suppose, taking his address, we cannot go further than the *as if*, still, there is no other known method of accounting for his conduct than by saying, he had some portion of intelligence.

> "Hold thou the good, define it well,
> For fear divine philosophy
> Should push beyond her mark and be
> Procuress to the Lords of Hell."
>
> *In Memoriam.*

If a man is insensible to the mystery of the universe; if the soul is that of an animal—unvisited by gleams of any brighter life, dead to the stirring sacred impulses of piety—how can we make him feel that of which his nature is incapable? Happily, no such man exists; and only men of souls most shrivelled, with narrow vision of life's realities and the world's vastness, can entertain the notion that our human organism is limited to the material mechanism. Encompassed by mysteries, subjected to influences of awe, tenderness, sympathy, which no words can express, no theories fully explain, with moral and æsthetic instincts, inclining us to the good, the pure, the beautiful; visited with convictions that there is a larger life than the visible firmament contains; and all these physically exhibiting themselves in actions and reactions

of the organism, we are compelled to regard them as memorials of the Supreme, and tokens that we are centres to which the intelligible universe converges, and from which it radiates. As we advance in science, the world enlarges with our knowledge; shall we, instead of growing with the world, allow an atheistic system to separate us from the universal existence by a quibbling statement—"There is no bridge," and thus lose our good portion in that glorious world which is deeper and higher than all phenomena? Are we to stop as men already at the finality of existence, though always having fresh experiences? Were it not better to hope that we shall, ere long, possess the keys which unlock mysteries, and reveal what is and will be? If a man say—"We have no organs for apprehension of the Supernatural," must we think that the Supernatural is incapable of manifesting Himself within us; and if we cannot think of an effect without a cause, or of creation without a creator, is not that a manifestation? If we cannot obtain from matter anything that was not contained in the original atom, though Godhead is revealed in a world of beauty, do we not rightly regard our intellectual and moral nature, those germs of goodness which enabled prophets and apostles to become so great, as revelations of the supernatural, a kind of bridge, so that we have experiences of Divinity, in the faithful use of which holy men do, indeed, as by a change of position, bring into view and within the circle of spiritual knowledge that which before was unknown?

STUDY X.

DAY III. THE HABITATION OF LIFE.

"Thou, O Spirit, that dost prefer,
Before all temples, the upright heart and pure,
Instruct me—for Thou knowest. Thou from the first
Wast present, and with mighty wings outspread,
Dove-like sat'st brooding on the vast abyss,
And made it pregnant. What in me is dark,
Illumine; what is low, raise and support;
That to the height of this great argument
I may assert eternal Providence,
And justify the ways of God to men." *Paradise Lost.*

By sacred geology we understand that the formation of the earth was by the Almighty. He did not labour as an artificer who shapes every work by handicraft. We do not conceive that every species of rhinoceros, and every species of hyæna, or the long succession of forms from earliest to present time, was separately constructed out of the dust. Nor did God create by intellectual or physical exercise, such as we are capable of, but by means of incomprehensible operations, now defined as natural order or law, He furnished space as the star-domed city of the great King; and now, through every star, through every grass-blade, but most through every living soul, beams the glory of an ever-present God. Natural law being the formula of Divine action, and all dynamic phenomena the multiform revelation of the Omniscient and Omnipresent.

By various orders of experience we may imagine humanwise the creative process. The passage of invisibles into visibles, as gas into light; the coming of the unseen vapour of water or steam, into the seen; are one step. We may think of germs growing into animals; or plants, great or small,

developing in such minute progression that at no moment can it be said, "now the seed ceases, now the tree exists." We then observe that the births of various plants and animals, separated by wide intervals of time, are analogous to epochs in the formation of stars and planets; as the earth may so change in the course of hundreds of thousands of years that none of the present forms of life exist; so in other starry worlds have been, are, and will be lifeless ages, living durations, and death periods. Within our intellectual conceptions we may hasten or retard the operation; and obtain as clear a view of creation as we can of evolution, indeed evolution rightly understood, is creation; showing the vast reach of organic phenomena, and rendering them intelligible. We may reverently regard the production now, of every child, and flower, and tree as a special creation: for the perpetual origination of countless individuals throughout the world, from hour to hour, is to the devout mind, the more miraculous because so ordinary.

Thought may take another turn: a straight line and a circle are not much alike—let the straight line be continued as a figure of infinity, and the circle be conceived vast as the universe. The one encloses a space; the other, continued for ever, will not enclose a space. The one is limited, the other may be unlimited; but if the straight line be bent so slightly that no eye—no, not even aided by a rule—can appreciate it, you may get an immensely elongated form; and, if you go on, may acquire the peculiar properties and special equations of the hyperbola, parabola, ellipse, and circle. The first and last, being quite opposite, are nevertheless made members of a series which you produce by insensible modifications. Such a mode of representation has been used to figure evolution; it may well and fairly be used as a symbol of that line and universe which He stretched and fashioned who went forth, by His will and power, to make all things in continuance. In continuance, for no one supposes that the oak, ready formed within the acorn, lies there in miniature. The oak is quite as much in the earth and air, not really in either, but formed from all. In like manner, when the eye was created, the means may have been the action of light on a suitable sensitive surface; then this

eye being brought into due relation with external objects, there would be visual perception. We may also picture to ourselves the forms of sense and the forms of thought, being created and developed in us, as are the branches and foliage of the oak evolved from the acorn. It matters little what name we give to the process; the great desire of our age is for a doctrine which shall arrange our knowledge, guide our researches, and shape our lives, so that right conduct shall be the result of true faith.

Scientific geology treats of what materials the earth is composed, and in what manner they are arranged. It reveals that the earth, some long time ago, was in a viscous or even perfectly liquid state. Cooling rapidly at the surface, the crust became denser than the liquid below; and, when broken by pressure from within, portions sank down, and solidification began on the newly exposed liquid surface. At depths of five hundred miles under the surface, there may be portions of the originally liquid mass at temperatures equivalent to red, or even white heat, but solid, as Sir William Thomson has shown by means of precession, and by other astronomical determinations: the whole mass of the earth being virtually solid, more rigid than if it were glass throughout, nearly as rigid as a solid mass of steel. Scientific geology, not limited to the mineral kingdom, nor to the various rocks and soils, relates the history of animals and plants: in fact, all the changes which have taken place in the former state of the earth's surface and interior, are investigated.

Science, thus ascertaining the manner and means by which the works of nature are wrought, is priestess of the physical universe, is a great benefactress, and we reverently receive her instructions. She describes and fairly well maps out the nearer portion of the pathway our earth has travelled; its varied period of existence as a revolving globe, the production of rocks, the gathering of seas, the depths out of which dry land was raised, and the emptiness of land and sea until both became many chambered habitations of life. It is proved that man had a beginning, that the animals had a beginning, and that the earth's surface was re-arranged again and again. Mountains were formed, raised, worn down, or

sunk; valleys have been excavated, filled up, and again dug out; sea became dry land, and land became sea; yet throughout all revolutions, and the accompanying vicissitudes of climate, animal and vegetable life was sustained, a continual modification fitting it for the different ages and stages of the world. A close analogy is shown to exist between extinct and recent species, and the continuance of the same organic laws is thus evidenced: ancient lakes in the Upper Miocene had round their borders belts of poplars and willows and shrubs. Leaves resembling those of the tamarind, with a ripe seed-vessel, have been found, and, on the same slab, a winged ant. We learn from this that the seed was ripened in summer, at which season alone ants have their wings fully developed, and make their flight.

In venturing upon a short sketch of chemical geology, or of what may be termed the cosmogenetic era in the history of our globe; and then explaining some of the phenomena of the great changes from that early period down to the present time; principles, rather than details of chemical action, will be dealt with.

Exact knowledge shows that mere fire and water are not the only great agents; the geologist must take into consideration the effects which are wrought by chemical action, heat, light, electricity, and mechanical force. It is known that mechanical force may be converted, directly or indirectly, not only into heat, but also into chemical action in the metamorphic alteration of rock masses. The Plutonic, Neptunic, Quiescent, and Cataclysmic schools of thought, do every one reveal principles which have had a share in nature's operations; and an independent observer finds that the same identical phenomena are at times the result of agencies totally different from those which at other times produced them. For example:—

Take crystallised silica, or quartz, it appears—

As an igneous product in recent volcanic lavas;

As an aqueous product, by crystallisation and deposition from solution;

As a gasolytic product, in tubes from deposition of its compounds with fluorine.

Sulphur is seen—

As an igneous product from volcanoes ;

As an aqueous product from hot springs.

As a product of decomposition of sulphides.

Numerous other examples might be given.

In applying chemical principles in explanation of the changes wrought in our globe, we shall not touch upon the asserted early gasiform condition as a nebula in space, nor inquire whether the elements then were in a state of chemical indifference to one another ; but deal with the earth in its heated condition of complete liquidity. There would be bodies of two different characters—solid and gasiform ; these, by their situation and rotation, would bring about the formation of a molten sphere surrounded by an intensely heated gasiform atmosphere. The affinity of bodies would be different, and their mutual chemical reactions vary considerably, from what takes place at ordinary temperatures ; so that our conclusions are, in great part, hypothetical ; those conclusions are as follows :—

The molten substances and their atmosphere, would obey the laws of gravity ; and arrange themselves in strata, or zones, according to their respective density.

The molten mass would arrange into three grand zones, probably with sub-zones ; i. an external crust of highly acid silicates, and probably much free quartz ; the bases of silicates being chiefly alumina and potash, with some soda, lime, magnesia, etc. ii. A zone of silicates of more basic character and greater density ; the bases being lime, magnesia, alumina, oxide of iron, soda, with minor quantities of potash, etc. iii. A far denser nucleus, containing most of the densest metallic elements ; in part, at least, combined with sulphur, arsenic, etc. These zones, formed in the earth, would be of somewhat stable character ; those in the atmosphere the reverse ; but, at first, the atmosphere, next the earth, would be composed of a dense vapour of compounds volatile only at high temperature—the chloride of sodium, probably, one of the most prominent. Above this, the carbonic acid ; then oxygen and

[1] See Lecture, in *Journal of the Chemical Society*, 20th February 1868, by David Forbes.

nitrogen : the vapour of water still higher. Afterwards, this arrangement would be gradually obliterated by diffusion; but it is imagined that, before diffusion, this arrangement had considerable influence.

The cooling of such an atmosphere would condense the vapour of salt, and other chlorides, etc., and cover the solid crust of the earth with a solid layer, it is calculated, sufficient to clothe the entire sphere with a coating of some ten feet in thickness. Then the condensed steam would fall in rain, which dissolving greater part of the salt, would form the ocean. The atmosphere would now contain much less oxygen ; and the carbon, in form of carbonic acid, would probably not differ much in composition from what it is now. The exact action, and extent of reaction ; the amount of any one element entering into any particular state of combination, cannot be defined. We may say, however, because the earth is so little flattened, it must have been rotating, when it became solid, at nearly the same rate at which it is now rotating. If we add, as the rate of rotation is undoubtedly becoming slower, it became solid not many millions of years since; otherwise, it would certainly have solidified into a flatter shape ; we arrive at the conclusion that we cannot allow geologists a greater possible period than about ten or fifteen millions of years.

There are arguments against these views; we will not advance them. Reference to the lecture on chemical geology, by David Forbes, delivered before the fellows of the Chemical Society, 20th February 1868, and to be found in the Journal of the Society for 1868, p. 213, will afford their refutation.

The mean specific gravity of the earth is 5·4 ; leaving out the water, the mean density of the exterior is not higher than 2·75 or 3 ; it follows that the interior is immensely more dense than the exterior. The crust, at first, might present a somewhat even contour ; but soon would be crossed by cracks and fissures, caused by contraction of the mass, and portions of the crust would fall in ; then protrusions of molten matter formed dykes on the surface. The sides of the cracks being more or less dislocated, lines of faults would interrupt the previously regular contour, and form the first elevations or mountains. From that time till the present all the

changes have been wrought, it is considered, by agencies similar to those now in operation. The crust, split and broken, would be further broken and pulverised by the mechanical action of water; assisted by the disintegrating and decomposing action of the carbonic acid, excessively present in the primeval atmosphere; and thus, in process of time, the actions of rivers and seas arranged the comminuted particles in sedimentary beds of varying density and character.

The development of organic life, at first of the lowest type, originated another character of deposits. Vegetation, assimilating the carbonic acid of the atmosphere, introduced beds of carbonaceous substance; and animals and plants, by joint operation, built up the limestones and calcareous strata. The formation of these strata did not proceed uninterruptedly: outbursts of igneous matter disturbed and broke the surface, forming dykes, ramifications, bosses, and sometimes intercalations between the beds. Showers of ashes were also sent forth from time to time. Any geological primer will explain the nature of the igneous, aqueous, and organic rocks. Human intelligence can assign a relative age for every one, and state when the plains and mountains were formed. The various strata are not necessarily separated by vast intervals of time, and the discovery of a universally existing microscopic vegetation shows, that by agency of the lowest and simplest organisms, our globe might be covered, and probably was covered, with all the chief strata.

For illustration of the history as to rocks, taking up a piece of granite, we discover that it was once molten within the earth. Finding a sandstone, it teaches us that small pieces of matter were compressed together, hardened, broken, rolled in and by water. If we have a lump of chalk, and gently grate or knead it down in water, we discover it to consist partly of microscopic chambered shells belonging to animals of simple form and life—protozoa. This chalk, with all other rocks containing relics, whether of vegetable or animal existence, belong to what are called "Organic Rocks." Coal is so much vegetation pressed together, and gradually changed into the black substance now used as fuel. In the deep parts

of the Atlantic Ocean millions and millions of little shells, called foraminifera, are being deposited; the remains of star-fish, and other creatures also leave their remains; if they continue undisturbed, a vast mass of rock will be formed out of these dead. The hills and dales of Derbyshire and Yorkshire are chiefly formed of limestone: a mass of the crowded remains of little animals which peopled the waters of the sea. These fossils, or remains, generally enable us to know the age and origin of the various and wonderfully arranged strata which form the crust of the earth.

Geologists define the life-time of the earth as Eozoic, dawn of life; Palæozoic, old life; Mesozoic, middle life; and Neozoic, new or modern life. These are also called Primary Epoch, Secondary Epoch, Tertiary Epoch, and Quaternary Epoch. They are apportioned into ages and eras of stratific formation.

The Eozoic time is supposed to represent that very period during which the first land was cooled and solidified from the fiery mass. Its rocks are the deepest and oldest, crumpled and folded in a remarkable manner, and the folds appear to have been formed before the deposit of the rocks next in age. There is inferential evidence, derived from the limestones, graphite carbon, and iron ore, of vegetable life, as there are undoubted remains of animal life, but the mystery of the origin of living things, and the secret of the changes which they underwent, remain hidden. The deepest and oldest existing rock or formation, the Laurentian Gneiss, is made up out of the waste of previous existing rocks, but of those pre-existing rocks we know nothing. The Laurentide Hills, north of the river St. Laurence, are the largest known exposure of this ancient formation. They are more than 30,000 feet in thickness, and occupy an area of about 200,000 square miles. It was formerly thought that the lowest rocks contained no vestiges of life, and were called Azoic, and that the ocean then existing was lifeless; but we have found that the Laurentian contains a gigantic representative of the earliest known life on earth, the Eozoon Canadense, the grandest of its class; flashing upon the scene like Melchisedec, without father, mother, or descent of days, the modern representatives

being poor indeed. We may possibly discover plants yet earlier: or an Eophyte period preceding the Eozoon.

The Palæozoic, called also Primary time, has its own ages and variety of strata: Cambrian, Silurian, Devonian, Carboniferous, Permian. The lower present but few traces of living beings, but the upper are crowded with fossils, no longer mere Protozoa, but representative of five orders of life. The sixth also, the Vertebrate, appears in fishes of many kinds. New forms of life come in continually: some, without previous representation, appear at once as kings; some, continuing but a little while, find a grave, and are no more seen. These meaner Enochs and Elijahs were not supernaturally removed, for others supernaturally to come; they simply indicate that the natural plan works by continual change. There are kinds which resemble the young of modern animals, but enlarged and exaggerated as had they outgrown themselves. The coal measures present remains of vegetables, insects, land-snails, fishes, reptiles—small and large, prophecies of things to come. In course of this vast time land rose above and subsided beneath the waters several times. There is something grand and awful in the thought of a world of vegetable and animal life—living, dying, slowly carried beneath the waters, and gradually raised again. In this vast duration nearly nine-tenths of all the known rocks were formed in the earth's crust, that is, if we reckon thickness. In the great pulses of the world more and more land was elevated, and the Permian flexures fixed the form of the now existing continents. A definite plan, working through long ages in regular march, seems to have correlated life with physical and organic change.

The Mesozoic, Secondary time, middle period of life, was occupied by myriads and myriads of organisms. On the rocks, formed during this and the Tertiary time, exist the most populous and civilised assemblages of mankind. The movements of the water, and action of the elements, rendered the earth favourable for that kind of vegetation and animal life which man requires. All the lower kingdoms of animal existence were present; birds swam on the surface of the deep, waded in the shallows, left their footprints on the land,

perched on the trees, and flew in the air. There was an abundance of singular plants, still represented in the tropics; and the great forests of the later Mesozoic were gay with flowers, beautiful in foliage, which swarmed with insect life. Gigantic lizards were remarkable, exhibiting a higher type of reptile organization than any now existing. Pterodactyles, somewhat like great bats, wheeled and screamed in the air, pouncing on smaller creatures of their kind, and perhaps diving into the sea for fish. It was the age of reptiles, of mighty and terrible creatures in sea and on land: not continuing till our day, not waiting for man to war against them, they perished in the great cretaceous subsidence. Apportioning this time into the Trias, Oolite, Wealden, and Cretaceous formations, it does not seem to have occupied, so far as we can judge by measurement of the deposits, one-third, or one-fourth, some say one-fifth or sixth, of the time taken up in the Palæozoic period.

The Neozoic or Tertiary time, the great age of Mammals, is subdivided into Eocene, dawn of recent life; Oligocene, recent; Miocene, less recent; Pliocene, more recent; Pleistocene, most recent. Fossils of the Eocene deposits are numerous. Plants, in the main, are closely allied to existing tropical and sub-tropical forms. Nummulites are remarkable, and bony fishes, reptiles, birds, mammals, represent most of the modern orders. The Oligocene formation between the Eocene and Miocene is slightly developed in the south of England, and vastly in the north-east of Italy. There were vast coral reefs in the period, and the varied nature of strata is remarkable for intermediate fauna. The Miocene was, in some respects, a better age than the present. The Northern Hemisphere possessed a mild and equable climate, a vast surface of land, a rich varied vegetation, and noble forms of animals. The Pliocene abounded in species of elephant, rhinoceros, hippopotamus, and horse, now extinct. There are abundant traces of oxen, deer, and carnivora. It is considered that from the Eocene to the Miocene was a time of rapid introduction of new species; but from the Pliocene to the post-Pliocene, and to the modern, there seems to have been a diminution of species. The Pleistocene is remarkable for

the advent of man. He seems to have had his first dwelling in the East, where flesh-food was not strictly necessary for him —a pleasant land.

> " These are Thy glorious works, Parent of good,
> Almighty, Thine this universal frame,
> Thus wondrous fair ; Thyself how wondrous then ! "
>
> *Paradise Lost.*

The history of the earth is wonderful. The consecutive formation of continents, deep oceans, and mountain-ranges indicate repeated upheavals, subsidences, and curvings, caused by the dissipation of heat. The extent and rapidity of these changes, the wear and tear of world-wide nature, were great in the earlier periods, and apparently irregular in their course, one wave interfering with another. It is not necessary to believe in many destructions and repeated new creations; we acknowledge an economy of internal and external parts—a continuous connection between the distribution of living things over the globe, their variation and modification, and the relations of land and sea. These physical changes were not fortuitous; but, with the wonderful art in nature seen in form, ornament, and physiology, are the sum of the action of mysterious Energy on matter, and part of a great philosophy. Every one being the complex of so many relations, a conjuncture of so many events, a synthesis of so many energies, that to know one event thoroughly is not possible, except by an intuition embracing the whole universe. Unity everywhere is an expression of will, and varieties unbounded show that law is not fate—things being different when the conditions of their existence change. The origin of life was by the interference of a Power exceeding all that is mechanical in matter: the introduction of a new state from a previous state by means of a process which we cannot investigate, and of which we know nothing: nevertheless we can affirm—Life is not a functional product, but that by which function is possible and actual. When vegetation appeared, the inorganic was subjected; when animals came, the vegetable was subordinated; and when man entered, life-energies advanced to mental and moral manifestations. The complication seems like a vast ocean-swell. On the surface large billows roll, themselves bearing

smaller waves and wavelets roughened by riplets, the accumulated momentum disappearing only to reappear. Every commencement having origin in some pre-existing source of power, this power being the manifestation of a principle, active in every form of matter and path of motion, impressing our thought with the conviction that beyond all, and containing all, is the Infinite and Eternal.

When godless men tell us that their mechanics are the highest phenomenal conception which can be formed to represent the Ineffable Reality, or rashly assert that humanity is the most perfect type of existence in the universe, they are like minnows mistaking their native rivulet for the outlying ocean. True men know that these rivulets have their origin in water-threads drawn from the mountain-side. They ascend the mountain, guided by the thread, till finally they arrive at the vast snow-fields of the summit. There, where earth ceases, they stand perplexed, thrilled, awed—they worship; worship the great God who makes the thread of light, the cloud of spray, the leaping cataract, the flowing river, the sea-wave, the floating mist, the snow-flake, to be embodied histories—successions of events—in which alone the ultimate particles of matter are real and lasting.

Of the innumerable combinations of matter in infinite space, and of the progressions of energy, we know but little. To assert that "yonder hundred million spheres" contain no forms of existence transcending manhood—as manhood transcends life in the rain-drop, that our intelligent will is not a sparklet of the Intelligent Will—is not so much a height of unwarrantable assumption as an abyss of folly. We are sure that there is a vast outlying Invisible World. No merely ideal production, though beyond the range of actual presentation, like snow at the North Pole. Mental vision, so far as science is concerned, being the only limit of verification; for the domain of the senses is almost infinitely small in comparison with the vast regions which can be traversed by the intellect. These regions are, some of them, in strict accordance with the visible, and may be dealt with in confidence; or they may be disengaged from conformity with the sensible, not written in any rubric of the known, though the phenomena

presented to sense may afford a base line for some proximate measurement of the parallax of the inaccessible, or yield indistinct views of a spirit-world wholly unlike the material world. A spirit-world not ceasing to be spiritual because it has means of passage to, and modes of action on, our intellectual and moral nature; even as refined and immaterial existences freely pervade the grosser. Thus we perceive that our range of possible knowledge is infinite, nor must we allow Materialists to deprive us of those vast and glorious operations which belong to intelligence, nor to shut us within the bars of that which we touch, taste, see, hear, smell.

The constant change by which the pole of our earth revolves round the pole of the ecliptic in 24,450 years, so that the pole-star of to-day will not be the pole-star 3000 years hence, is a regulated process extending to all things, even to those which seem lawless. The two hundred and seventy volcanoes constantly or intermittently throwing out steam, hot ashes, and lava; the story of the submergence of an ancient continent, whether fabulous or true; the Atlantis of Plato, even if but a myth; may be accounted for by law. Law, infinite in variety of operation, making of the sea a continent, and of the continent a Polynesia; interspersing catastrophes with uniform operations, so that no catastrophe is too great or too sudden to be theoretically inconsistent with the reign of law; variations in flora and fauna being wrought by some continuous influence acting for ages, or, it may be, at some special moment starting out on a new line, or a comparatively swift energy stamping old forms with a new type. One germ is microscopic, but it develops into a highly organised animal. Another germ is also microscopic, but it becomes an animal altogether different, or no animal at all—a plant. These changes are all governed by a deep and wide-reaching law, but we are absolutely ignorant of it. Must we say, because our imperfect symbols whereby we try to realise that which sustains the law, are unable, apart from Revelation, to construct a science of the Deity, "Law is Fate?" Certainly not. The world, in some respects, is inscrutable as the Godhead; but we know much of that world, and that our will avails something in it; know of God, and that His will avails much more. To say that the Supreme

must not be accounted Intelligent because all our notions of intelligence are limited, is equal to the absurdity of declaring that there cannot be one infinite space, because space, however extended, must lie within another space.

It has been well said, "The undevout astronomer is mad." Why mad? Because he knows, and no one better, that the worlds in space are manifestations of a Power to which no limits can be assigned, either in time or space. This is the scientific, fundamental truth as to Godhead, and the astronomer, the man of science, knows, unless he is the fool of Scripture, that "the heavens declare the glory of God."

To tell us we must not worship God because His essence, His energy, His infinity, His eternity, His omnipresence, are incomprehensible, draws forth the reply, "When our intelligence is baffled, when the Infinite confronts us, we worship." Not ignorantly, not measuring the Creator by the creature, we adore Him as that highest absolute Being in whom all possibilities of existence are comprehended. We consecrate memories of the illustrious dead—those who, under God, have made us what we are. We rejoice in that communion of saints, unseen yet real, whose heroic sufferings rise melodiously to heaven as a sacred prayer—whose heroic actions are a psalm of praise; and our enthusiasm grows into devotion, reverence, and majestic grandeur, when assembled myriads worship.

We take facts as we find them. Butler said,—"Things are what they are, and the consequences of them will be what they will be; why, then, should we desire to be deceived?" The duration of life on our globe is but a single pulsation of the mighty life of the universe. Nay, the duration of the planetary system itself is scarcely more. Life, then, is a very small matter; yet, for life the whole scheme seems planned. Countless other systems, unless science is utterly at fault, passed through their processes and died out, that our sun and his family might be formed of their nebulæ; and countless others will be built when our habitation of life has fallen to ruin. The infinite universe is, and must be, so far as we can understand, without beginning and without end. The centre is everywhere, the circumference nowhere. Not suns only, but systems of suns, and galaxies of systems, are passing

to higher and higher orders—connected with time intervals infinitely great and infinitely small. Infinitely small as compared with eternity in which they are lost. Infinitely great in comparison with the duration of our earth, and the yet smaller span of its existence as a dwelling for life. Nevertheless, it is at the least "probable that every member of every order—planet, sun, galaxy, and so onward to higher and higher orders endlessly—has been, is now, or will hereafter be, life-supporting 'after its kind.'"[1] It is therefore utter unwisdom to suppose that our earth is the only inhabited orb of the universe. Though, when we scan the sky, millions of lifeless worlds are found—for every life-sustaining star; and though the life-sustaining condition of stars and suns and galaxies is a period short indeed as compared with their duration; yet that life-period is their flower and fruit time.

It seems, indeed, as if the support of life was nature's great purpose. Land, water, air, teem with life. In the bitter cold of arctic regions, with strange alternations of long summer day and long winter night, frozen seas, perennial ice, and scanty vegetation, life has its hundred forms. The torrid zone, blazing with heat, parched with drought, fierce raging hurricanes driving away oppressive calms, contains myriads and myriads of living things. Mountain summits, depths of valleys, mid-ocean, arid desert, are all inhabited. So, likewise, in past ages there was abundant life. No trace remains of millions and millions of the primitive living creatures in the earliest eras; yet, from the remains of other eras we know that living creatures abounded in the sea—forming strata after strata; and that on the land multitudes of creatures fed.

This incalculable multiplication of life on earth is due to solar agency; and physical laws, like those ruling our planet, are traced everywhere; the unbounded diffusion of sun and starlight warrants our faith that there is life in many worlds. The same physical laws operate wherever matter is, and we reasonably conclude that the same moral power exists in every abode of mind. Why may not the universe be aglow with the lamplight and hearth-light of many happy homes? The suns are not mere gilded shows, nor blazing points. They are sources

[1] "Life in Other Worlds:" Richard A. Proctor.

whence flow the physical power by which advances are made through low grades of being to high corporeity. The material universe is a palace of the King, vast in extent, great in duration, rich with varied existences of intelligent creatures. Our own home is only a hamlet on the side of a great mountain range; but the magnificent bodies of light, scattered over infinite fields of space; worlds and worlds suspended in heights and depths; are palaces lit up with splendour. We cannot but think that the Intelligence, at the very heart of things, is conducting many families in the paths of love. Life is not a continual struggle with brute irresistible force, but a process whose work is survival of the best. Our thoughts, when gone, are not dead; or if dead and buried in forgetfulness, recollection, the angel of memory, raises them, and they live again. Shall not all the dead be raised? Are we not as lasting on the spiritual as on the physical side of our nature?

"My heart is renewed within me when I think
Of the great miracle that still goes on
In silence round me—the perpetual work
Of Thy creation, finished, yet renew'd
For ever."

WILLIAM CULLEN BRYANT.

STUDY XI.

DAY III.—CREATION OF PLANTS.

"Flower in the crannied wall,
I pluck you out of the crannies;
Hold you here, root and all in my hand,
Little flower—but if I could understand
What you are, root and all, and all in all,
I could know what God and man is."—*Tennyson.*

STUDY the Divine statement—"Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself, upon the earth."

Plants are organized living beings, void of feeling and voluntary motion. All living organisms are continually receiving additions to their substances; and so long as these exceed in quantity the parts removed they grow. Growth is the power to receive nutritive matter, and add it to the structure: that is, integrating the surrounding elements with itself. The growth of a plant depends on the abundance and sizes of the masses of nutriment which it is able to appropriate. Growth has limits, but they are wide apart. At one extreme may be invisible organisms, for certainly there are monads so minute as to be but imperfectly visible even with microscopes of the highest power; at the other extreme are trees of four hundred feet in stature. High organization is not always accompanied by great size; nor is the ultimate maximum determined by the initial bulk; but the possible extent of growth, other things equal, depends on the organization. "Who would believe that, did not he every day see it; who can conceive how, although he seeth it, from a little, dry, ill-favoured, insipid seed thrown into the earth, there would rise so goodly a plant, endued with so exact figure, so fragrant smell, so delicate taste, so lively colour; by what engines it

attracteth, by what discretion it culleth out, by what hands it mouldeth, its proper aliment; by what artifice it doth elaborate the same so curiously, and incorporate it with itself?"[1] This act of growth, not explainable on any known mechanical principles, is called "vital;" and the origin is thus stated in Scripture—"God causeth the grass to grow for the cattle, and herb for the service of man" (Ps. civ. 14).

The food necessary for this development, except carbonic acid—taken in by the leaves, is drawn from the soil by means of the root. The food substances are carbonic acid, ammonia, alkaline and earthy salts dissolved in water. Carbonic acid is dissolved by the rain in passing through the atmosphere, and produced by the slow decomposition of mould—the carbon of which unites with the oxygen of the air held by the water in solution. A little nitric acid may be formed by the direct oxidation of the air during storms. The ammonia is a product of decay. Carbon is to be specially distinguished: it combines with other elements in manifold relations of number and weight, and with oxygen, hydrogen, and specially nitrogen, forms that protein matter which is the staff of all life.

The organized substances, formed in the plants, are generally ternary compounds of carbon, hydrogen, and oxygen. Carbonic acid, ammonia, soluble phosphates, and sulphates supply most of their materials. The alkaline bases, which play an important part in vegetation, reside in the rocks—which must be decomposed and become arable soil for its nourishment.

All living things respire, *i.e.* give off carbonic acid as the result of the wear and tear of tissues. The process is *masked* in plants by the taking in of a greater quantity of carbonic acid, and its decomposition. Fungi are, in some respects, like animals. They live on organic food, inhale oxygen and give out carbonic acid. The roots and leaves of the higher plants are widely different in their functions: the roots absorb water and mineral substances, the leaves take in and decompose carbonic acid. The excretion of plants is chiefly by the roots; but also by the leaves, glands, and bark. Thus, to

[1] "A Defence of the Blessed Trinity:" Isaac Barrow, D.D.

perform the nutritive functions of their life, plants absorb, breathe, assimilate, perspire, and excrete. Nor is this all—they sleep by night, awake by day, and are of different sexes.

"Let us, in imagination, peer into the ultimate particles of the living, active, moving matter, and consider what we should probably discover. Were it possible to see things so very small, I think we should discover spherules of extreme minuteness, each being composed of still smaller spherules, and these spherules infinitely minute. Such spherules would have upon their surface a small quantity of matter differing in properties from that in the interior, but so soft and different that the particles might come into very close proximity. In each little spherule the matter would be in active movement, and new minute spherules would be springing into being in its central part. Those spherules already formed would be making their way outwards so as to give place to new ones which continually rise in the centre of every one of those animated particles. . . . The change which occurs in the living centre is probably sudden and abrupt. The life flashes, as it were, into the inanimate particles and they live."[1] This is a scientific conception of the manner in which the work was done, when God said—"Let the earth bring forth grass."

It is really a very nice question whether we can trace any difference between the ultimate plant and the ultimate animal. Corals, long taken for vegetables, are, after all, animals. There are certain minute fresh-water animals which may be cut to pieces and multiplied exactly as plants are multiplied by cuttings. Cuvier, in the first volume of his great work, "Regime Animal," says, an animal has power of locomotion, an internal reservoir in which to carry its food, a digestive cavity, and an alimentary canal. He further states, that an animal must possess muscles, nerves, and all that apparatus, by which locomotion is brought about; must have a more complicated structure than a plant—for while a plant is composed of oxygen, hydrogen, and carbon, an animal possesses also nitrogen. He claimed, as an essential feature

[1] Dr Beale's Prot., 3d ed. p. 277.

in animals, that they took in oxygen, and gave out carbonic acid; while plants took in carbonic acid, and gave out oxygen. Now, as matter of fact, very few of these diagnostic marks stood the test of further inquiry. There are innumerable lower organisms which feed as animals, but have no permanent digestive cavity. They are soft masses which take in food at any point of their circumference, and get rid of it in the same way. As to an animal being of a more complicated structure, we find, by means of the high powered microscope, that animal and plant start from one common point; all the diverse tissues issuing from a fundamental form—the cell: the wood cell of a plant being developed in the same way as a scale of the epidermis in man. The starting point, both in plant and man, is a mass of similar nucleated cells. As to chemical composition, recent investigations show that all living matter contains nitrogen. As to the statement that animals take in oxygen, and give out carbonic acid; while plants take in carbonic acid, und give out oxygen; it is now shown that, when the sun ceases to shine, the plant exhales carbonic acid just the same as an animal; and that colourless plants and fungi exist like animals—taking in oxygen and giving off carbonic acid. The mobility of plants also is now well established. Multitudes of plants are all their life in active motion; and no clear line can be drawn between the contractility of plants and animals. Considering the insectivorous plants, it is almost impossible to distinguish by any visible character, a difference in the reflex action existing in plants and that existing in animals: so that no one can say whether plants have or have not a nervous system. It is true, however, a plant is able to make its bodily substance out of inorganic chemical substances; which an animal cannot do. A bean will grow in a nitrate of ammonia and saline solution; and the resulting substance of the bean contains matters of which there is no trace in the solution. An animal can only break down and appropriate the protein compounds furnished by other animals or plants. "He is the aristocrat, and the plant is the ideal prolétaire of the living world." The Bacteria, generated in vegetable and animal infusions by means of germs which float in the air, are

vegetable; but that other busy little body generated in the same infusion, which Professor Huxley calls "Heteromita Lens," may be animal; there is a border territory between the two kingdoms, a sort of neutral land, the inhabitants of which cannot be separated with any certainty, or brought to their proper allegiance in either kingdom. We cannot as yet say, "Here the line between the animal and the plant must be drawn."

Tournefort's system of vegetation contains twenty-two classes; that of Linnæus, twenty-four; the natural method by Jussieu, the basis of a complete scientific tabulation, comprises fifteen classes, one hundred natural orders, and about one thousand seven hundred and forty genera. The sequence of orders now generally adopted is that proposed by De Candole.[1] The result of all the various schemes establishes two primary divisions of all plants :—

a. Phænogams, or Flowering Plants.
b. Cryptogams, or Flowerless Plants.
a. The Phænogams subdivide into—
1. Dicotyledons—plants with two seed lobes;
2. Monocotyledons—plants with one seed lobe.
b. The Cryptogams subdivide into—
3. Acrogens—vascular plants for the most part;
4. Thallogens—purely cellular plants.

"Beyond this, except in the case of Cryptogams, it is difficult to establish any subdivisions higher than that of Orders; and of the Phænogamous Orders themselves, it is astonishing how few are absolutely limited."[2]

To assert that Moses has given, in his brief account of the formation of plants, a prophecy of scientific classification would be unwarrantable; but it is, to say the least, remarkable that his "Grass," "Herb," "Plant" (Gen. ii. 5), "Tree," should happen to be that number of which scientific men say —"It is difficult to establish any divisions higher than that of orders;" "In the popular mind, plants are still classed under the heads of trees, shrubs, and herbs; and this serial classing, according to the simple attribute of magnitude,

[1] "Descriptive and Analytical Botany :" arranged by Dr Hooker, p. 165.
[2] "Descriptive and Analytical Botany :" arranged by Dr Hooker, p. 991.

swayed the earliest observers."[1] The utter indefiniteness of ancient sacred description, wanting even the rudiments of scientific form, may fairly and safely be taken as a commendation: for as to Phænogams, the first and chiefest of the Botanical Kingdom, "a large proportion either are connected with one or more others by a series of interminable genera, or contain genera which present so many of the characters of other orders, that it is altogether uncertain in which of them they shall be placed."[2] Nor is it to be forgotten, that the roots of the Hebrew words themselves yield a more correct and scientific meaning, if such be required; but it is more akin to the spirit of the Divine narrative to take the Scriptural simple and popular compendium—grass, herb, plant, tree—which men generally look upon as including all vegetation. Had Moses endeavoured to give us some idea of the results of evolution, so far as they are now accurately known, he could not better have described them than "by seizing the successive salient points in a continuous history of myriads of years—projecting them on the mind like a succession of dissolving views, which gather into distinctness or fade away into nothingness, like the dawning and the parting of the day."[3]

No hard and fast lines can be drawn. We have remarked already that of the two hundred and seventy-eight of the Phænogamous or flowering orders, described by Dr Hooker, "Descriptive and Analytical Botany," excluding those containing only one or two genera, it is astonishing how few are absolutely limited. With flowerless plants, or Cryptogams, the case is different; but even these can only be strictly limited, if it be limitation, by making them very comprehensive. The same fact extends through all natural history. There are whole classes of organisms to which it is impossible, even with the widest reservations, to apply the old idea of species, with its immutability of essential characteristics.[4] Botanical and other

[1] "Principles of Biology," vol. i. p. 295 : Herbert Spencer.
[2] "Descriptive and Analytical Botany :" arranged by Dr Hooker.
[3] Rev. T. G. Bonney, "University Sermon :" Cambridge, April 29, 1877.
[4] "The Doctrine of Descent :" Professor Oscar Schmidt.

systems are of a superficial description; they rest upon forms which are in an extreme grade of mutability; and it is not a little wonderful that Scripture should give a general formula which substantially contains the present scientific classification.

It may be said of the creative narrative—"only those vegetable productions are meant which are useful to man; and that trees and plants of this character, were of latter appearance on earth, and only just preceded man.

The best reply to such an objection is utter denial. One must not be tempted into argument that the families of vegetables and animals were probably introduced according to the order in which naturalists have of late classed the flora and fauna. It is better to rely on the general and comprehensive character of Scripture; it were needless to seek scientific and technical accuracy; for, really, the objection confirms the ancient narrative. Grass, herb, tree, fruit-tree are simple comprehensive words, which of old, and even now, popularly sum up all vegetable life. Vegetation grew from the simpler to more complex forms. The earliest plants which are known in the fossil condition to geologists are fucoids, and they were probably true sea-weeds or algæ. In fossil shells of the Palæozoic Age, traces of the presence of microscopic fungi, such as Achlya Penetrans (Duncan), have been found. Some of the higher cryptogams, closely allied in their construction to those now existing, have been got out in the fossil condition from the Devonian and Carboniferous strata, associated with Calamites and Lepidodendron. Thus the earliest plants were marine. Then came land forms of simple and more complex construction, but still belonging to the lower orders. Conifers, or gymnospermous exogens, were with these and other plants in the Carboniferous age; and thus there was structural variety in those remote days. Flowerless plants, lacking both stems and leaves, were succeeded by those possessing stems and leaves. The early plants could contribute little, if at all, to the support of high animal life; nevertheless, grass and herb are of ancient origin, existed very early; their existence may certainly be inferred, from the presence of various insects in the Lias and Tertiaries. Dicotyledons, of angio-

spermous kinds, abounded in the cretaceous strata of America and Europe. Probably, preceding all these, a microscopic vegetation universally existed. It is a beauty, and not defect, that the simple formula of words given in the Bible contains and describes lowest and highest products, the earliest and latest vegetable life.

Who will say that the modern scientific classification—

Phænogams or Flowering Plants,	**1. Plants with one seed lobe.** **2. Plants with two seed lobes.**
Cryptogams or Flowerless Plants,	**3. Vascular Plants for the most part.** **4. Purely Cellular plants.**

is simpler, more comprehensive, intelligible and beautiful for ordinary people than the ancient words, roughly translated, grass, herb, plant, tree?

We may now summarise, in briefest possible manner, the succession of vegetable life on the earth. The groups did not come into existence at once; in the main, the lower groups appeared first, and the higher groups last, substantially in accord with the Scriptural statement. The earliest known vegetation "consisted principally of the lowly organised Cryptogamous or flowerless plants. The Mesozoic formations, up to the Chalk, are especially characterised by the naked-seeded flowering plants,—the Conifers and the Cycads; while the higher groups of the Angiospermous Exogens and Monocotyledons characterise the Upper Cretaceous and Tertiary Rocks."[1] The process was slow and gradual, and, for the most part, without sudden breaks, proceeding to a greater or less extent, by way of evolution; so that many existing species are the modified descendants of fossil forms, even as those were derived from pre-existent forms. At the same time, there are facts which prove the existence of some law of a deep and far-reaching character, by which alone can be explained the constant introduction, throughout geological time, of new forms of life; for example, the wonderful Dicotyledonous flora of the Upper Cretaceous period bursts into view without any prophetic announcement from the older Jurassic.[2] This is yet more specially the case with animal life. So far

[1] "The Ancient Life History of the Earth," p. 371: H. Alleyne Nicholson.
[2] "The Ancient Life History of the Earth," p. 373: H. Alleyne Nicholson.

as we know, the Graptolites and Trilobites had no predecessors, and have no successors. Insects appear suddenly in the Devonian and the Arachnides and Myriapods in the Carboniferous strata, under "well differentiated and highly specialised types."[1] Nor is this all. There are various groups, and some of them highly organised, which continue almost unchanged, and certainly unprogressive, throughout geological time. They indicate that under given conditions, at present unknown, a life-form may subsist for an almost indefinite period without any modification in its structure. One cannot but admire, in connection with this continuance of work "by some orderly and constantly-acting law of modification and evolution,"[2] and in connection with "the constant introduction throughout geological time of new forms of life," which "have no known predecessors and have no successors,"[3] the scriptural use of the word Day. Day, in its minuteness, reduces the initiation of living things to exceeding brevity of time; and day, in its expansiveness, comprehends innumerable ages; so that whether we think of the constant introduction of new forms, or of the continuous operation by which old forms are modified, both are wrought in the Day of God.

Pursue the inquiry:—

i. Is it possible that plants were produced under a denser, cloudier moisture and more disturbed atmosphere than the present?

ii. Did plants precede animals?

iii. Were plants of Divine origination?

i. As to the origination of plants without sunlight, we must at once admit that it is simply impossible for the cooled earth to have been without the sun as luminary, and without alternate day and night. Tidal marks are found in the lowest rocks (azoic), and thus we know, comparatively early, of the moon. It is also to be taken as a fact that the sun, like the earth, was formerly hotter than at present. "We can imagine that one effect of its heat was to throw off from its surface such enormous clouds of absorbing vapour, which cooled as they left the sur-

[1] "The Ancient Life History of the Earth," p. 373: H. Alleyne Nicholson.
[2] "The Ancient Life History of the Earth," p. 372: H. Alleyne Nicholson.
[3] "The Ancient Life History of the Earth," p. 373: H. Alleyne Nicholson.

face, that the effective amount of radiation reaching the earth might not have been greater than at present. So it is possible to conceive a uniformitarian state of radiation from the sun, accounting for it by saying that when the sun was hottest and was radiating the most, it was simultaneously raising the greatest amount of obstructions to the propagation of radiations from its surface. A similar argument might, of course, be devised with reference to the greater amount of vapour which increased solar radiation would raise to be condensed in the earth's atmosphere."[1] Hence it is at least not improbable that the photosphere might be partially obscured by non-luminous matter, and that a dense cloudy atmosphere surrounded the earth. In any case, the earth long ago was an incandescent mass, itself as a sun; and only as the earth cooled and darkened would the sun and moon be revealed as rulers of day and night.

Plants, as a class, contain little nitrogen, and are dependent on solar rays for their vital activities; but there is, at least, one marked exception. Of a considerable group, the Fungi, many members, if not all, can live and grow in the dark. Moreover, in great depths of the sea unpierced by light, in dark caves, and in many places of gloomy obscurity, there is vegetable life. The light, however, comes from heat; is a transformation of heat from the sun and from the earth. The seed of a plant, buried in the damp earth, grows by the integration of adjacent nutritive materials; the energy effecting this union is, or is by, the undulations caused by warmth of the soil. Diminish the warmth, as in winter, and the seed will not grow. As to the sun's action, the slower undulations, dark waves, not seen, penetrate the soil, set in motion the atoms of the rootlet, and enable them to shake hydrogen atoms out of equilibrium with oxygen atoms. Such is the operation at the root.

This helps us to conceive the possibility and reality and nature of the earliest vegetation: rudimentary sporules, with neither radicle nor plumule, possessing some resemblance to imperfect plants that are counted of recent formation.

So soon as plants with delicate green stalks tipped with

[1] "Recent Advances in Physical Science," p. 174: P. G. Tait, M.A.

leaflets are to be formed, there must be those rapid waves of the sunbeam, known as light and actinism. These enable the leaflets to decompose the carbonic acid of the atmosphere, by communicating their motor energy to the atoms of chlorophyll, so that they can dislodge adjacent atoms of carbon from the carbonic acid in which they are suspended.

Hence, whether viewed popularly or scientifically, we have a great truth: the Energy preparing those germs developed in the earliest manifestations of vegetative force was in operation even when the sun and earth abode in cloudy tabernacles. We can well understand that Moses might have a moral purpose in view, that to check the idolatry of sun-worshippers he would wish to state that life was of God in its origination, not by the sun, before the sun; but that his so-called rough, unscientific account should agree with the latest scientific verity —that life-energy, indeed all energy, is a product and transformation of pre-existent energy—can by no means be owing to his wisdom; it must be attributed to that power which we name "Divine Inspiration."

ii. Did plants precede animals?

Relics of animals are found in the oldest rocks, with the lowest and earliest known vegetable forms. It is possible, barely probable, that the primal forms of life have been preserved in some primitive fossils. From the layers of crystalline charcoal (graphite), and crystalline limestone (marble), found in the metamorphic rocks, we conclude that vegetable and animal life existed side by side in earlier times. Certainly, animal life did not wait till vegetation was perfected; the lower forms soon appeared, and grew contemporaneously with plants, both advancing till land and sea were replenished.

Plants, as a class, exhaling oxygen, and animals, respiring carbonic acid, are necessary to one another; nor can the highest forms of either exist without the presence of both in the earth: plants building up themselves with the carbonic acid given out by animals, and animals inspiring the oxygen which plants exhale. The balance of the gases and elements is thus beneficially maintained by the antagonistic compensating actions of the two kingdoms, whose continuous adjustment of internal relations to external relations necessitates

and comprehends all the activities of vegetable and animal life.

Finding relics of both in the oldest rocks; that both are needed for the highest forms of either to exist; and that, viewed in their earliest forms, the animal arises as the plant; for, so far as form and substance can be ascertained, they are not separable; the primordial cell of a nettle and the first germ of man being undistinguishable from one another, even by the aid of a powerful microscope, we might conclude that their nature is the same. Nevertheless, they have not the same birth-day, do not live after the same manner, nor upon the same substance. The following twofold fact proves that animals and plants are essentially distinct and wide apart. Plants can form protoplasm,—that is, support themselves by means of inorganic substances; animals cannot. Carbon and oxygen unite to form carbonic acid, hydrogen and oxygen produce water, nitrogen and hydrogen give rise to ammonia. These are all lifeless; on these a plant lives and thrives, but an animal famishes and dies. The animal's highest feat of constructive chemistry is to raise dead protoplasm to a higher form of living protoplasm; but plants form protoplasm of that which is not protoplasm, even from carbonic acid water and ammonia. They, and they alone, build up that matter of life which is the vital substance of the universe. We can hardly think that Moses was accurately acquainted with the discoveries of modern chemical science; nevertheless, he records that plants preceded animals.

iii. Were plants of Divine origination?

The Power by which matter organises itself, grows into shape, and assumes definite forms in obedience to the definite actions of energy, is a manifestation of that great Unknown whom all phenomena reveal; otherwise, the molecules themselves are creators; and we have no end of little gods. The celebrated Robert Boyle regarded the universe as a machine —a machine may be defined as an organism with life and direction from outside. Thomas Carlyle prefers regarding it as a tree—a tree may be defined as an organism with life and direction within. We, in a degree, may adopt both conceptions, for both imply the interdependence and harmonious

interaction of parts, and the subordination of organisms to the universal plan. The elements do not spontaneously convert themselves now into iron or wood; now into the oak, or into a giant tree on the shores of the Senegal; now into the delicate petals of an evanescent flower, or into human brain. If the ruling power is not Spirit, all things are material, and there is no ruling Mind; but all things are not material. We have the "imponderables,"—things of old supposed to be matter,—such as heat, light, etc., now known to be but varieties of Energy. These are not matter, but have as real and objective existence as any portion of matter. How is it, moreover, that we, if nothing but material organisms, feel, think, remember, will, and discharge the functions proper to mind? If in us matter has manifestations of mind, why not in the universe at large? It is but strife of words to contend whether the powers be of mind or matter; in either case, organism generates intelligence, or is by intelligence generated. Any way, Intelligence is in the world. This Intelligence, better than all, cannot be the slave or helpless plaything of blind fatality,—of something mindless, reasonless, soulless. God is that Intelligence, and from Him the power must proceed; otherwise, brute force is god.

We may safely admit the natural agency which science has discovered,—"All the energy which we derive from plants and animals is drawn from the sun, ... the energies which we have been accustomed to call vital . . . . may have a proximately mechanical origin."[1] Very well, there is not the least objection to a mechanical formula for what belongs to mechanics. When God said, "Let the earth bring forth," the earth brought forth by its own God-given power; and mechanical power, vital power, moral power, spiritual power, are all emanations of Divine energy. "The reason why the old fable speaks of the spontaneous life of men is, that in those days God Himself was their Shepherd, and ruled over them, just as man, who is by comparison a Divine being, still rules over the animals."[2]

When God placed sun, moon, and stars in the firmament, to lighten this and other worlds, He endued them with

[1] "Vitality:" Professor Tyndall.

[2] "Plato's Dialogues. Statesman," p. 271: Dr Jowett's Translation.

seasonable and prolific influence. It may be audacious and startling, but not new to say, "We are all children of the sun." "It is of little moment whether we express the phenomena of matter in terms of spirit, or the phenomena of spirit in terms of matter,"[1] if we allow that matter is not a brutal and malignant thing, but that good servant of God by whom wonderful works are done, and with which beautiful shapes are wrought. Moses had anticipated scientific theories when he wrote of "precious fruits brought forth by the sun" (Deut. xxxiii. 14); and he warns us against both ancient and modern sun-worshippers by recording the fact that God can and does make these things according to His own will.

The scientific hypothesis is that life began in simple primordial organisms. The Bible account in no way contradicts the microscopic statement, but builds up all life from the ground; and the hypothetical monads or protoplasms, or whatever they may ultimately be called, of grass, herb, plant, tree, which were caused to have in themselves the power of reproduction, are as wonderful and complicate in their origination and development as would be the instantaneous appearance of trees already loaded with fruit. Worlds within worlds were contained in those early organisms. They enclosed, potentially, the beauty, power, and life of grass, herb, tree. Milton wrote:—

> "One first matter all,
> Endued with various forms, various degrees
> Of substance, and in things that live, of life;
> But more refined, more spirituous and pure,
> As nearer to Him placed or nearer tending;
> Each in their several active spheres assigned;
> Till body up to spirit work in bounds
> Proportioned in each kind."—*Paradise Lost.*

Richter conveys a lesson good and true—"I picked up in the choir a faded rose-leaf, that lay under the feet of the boys. Great God! what had I in my hand but a small leaf with a little dust upon it; and upon the small fugitive thing fancy built a whole paradise of joy, a whole summer dwelt upon this leaf. I thought of the beautiful day when the boy

[1] "Physical Basis of Life:" Prof. Huxley.

held this flower in his hand; and when through the church-window, he saw the heaven, and the clouds wandering over it; when every place in the cool vault was full of sunlight, and reminded him of the shadows on the grass from the over-flying clouds. Great God! Thou scatterest satisfaction every-where, and givest to everyone joys to impart again. Not merely dost Thou invite us to rest and exciting pleasures, Thou givest to the smallest an exciting perfume."

No psychologist will deny that plant life affords glimpses of the transcendental. It combines many principles, brings into concert many powers; and the delicacy of its parts, the complexity of its construction, the special and elaborate adaptation of function to function, denote high art in form and colour; and are, in some respects, an epitome of all being. We have in plants a mirror of the adaptation of the general properties and affinities of the inorganic world to the purposes of life. In the several members, organs, and functions of the plants, we possess the first lodgment of the spirit of life wrought into nature by the creative energy of the Eternal. Plants, endowed with life, are not self-living. The general spirit of life is in them, but they have no soul; not even that brute-soul which is attributed to beasts. The psychological fact, for symbolical refraction is—that in every human soul is first formed a tree of life, rooted in the heart, attaining summit or crown in the spirit. "Thus, as by the tree of life, the kingdom of plants is represented in the soul. There are formed in it also, by strong spiritual operation, lifeless forms, more strongly or more weakly stamped as animal, which encamp around our heart; and these, even though they have no life of their own, are stirred at the heaving of the passions."[1]

The thought, even though it be visionary or poetical, is worth enlarging, and in another direction. Try to conceive of a spirit, in its initial period, secluded from contact with the material universe, acquainted only with mind. Such a spirit, awaking to consciousness of the properties of matter, would become, so to speak, new born; and take possession of another nature. He would find the various substances which

[1] "System of Biblical Psychology:" Prof. F. Delitzsch.

are furnished by the soil, compounded, by modes transcendental, into other specific substances. The mechanical adjustment of parts, root, stem, and leaves, in absorbing, respiring, and expiring, in secreting, accreting, and excreting, containing, in a mystery, the animal system—that harmony of a thousand elements. Taught by this material knowledge, that spirit would begin to reflect upon its own nature. Thus the genesis of matter, and the introduction of natural life, possibly enlarged the knowledge and power of the spirit-world. Consciousness of the natural world, we infer, may impart to spirits an experience somewhat akin to that which spirit imparts to the human soul. Passing things more recondite, there would be the fact of solid extension, the mechanical properties of hardness, softness, roughness, weight; the chemical properties in their varieties of pungencies, flavours, perfumes; and the vibrations of sound in melody and harmony; so refined, numerous, and complicated as to double all former powers of enjoyment. The boundary is not yet attained of sensitive existence: more light would break in, and the universe stand revealed in all its beauties and glories. The great contriving Mind would be viewed, ever and ever starting from and to a higher point; not only in effecting delicate and complicated mechanism, but in so adapting the elements of the material and spiritual systems that eternity calls time to walk in nature's wonderful avenue. More mysterious still, spirit enters flesh; then, wonder of wonders! in fulness of time, the Infinite and Eternal, who incomprehensibly manifests Himself in space and time by all phenomena, dwells in that holy human form, Jesus.

Language fails in utterance of thought. Who can put into words the deep truths which underlie our consciousness of those vast substantial spiritual realities on which are based the glorious things of Revelation. The commonest facts which lie ready to our hand, in their essence, have relations with infinity; nor can we understand how moments of time are linked by consciousness into the chain of our life; but still, though with darkling rather than glimmering knowledge as to possible instruction of angels by the creation of our own world, the symbols used may be fairly taken as indications

that our own knowledge and faculties of enjoyment will enlarge in the future according to the measure of Divine things attained in this life, and that these seeds of wisdom will not only grow into flowers of thought, but yield glorious fruit in some paradise of God.

STUDY XII.

DAY IV.—THE SUN.

"There are men who, seeing the great power this sun hath, are secretly enticed in their heart; and with their mouth have kissed their hand to him."—JOB xxxi. 26, 27.

TWO dangers are to be guarded against in handling any science touching Holy Scripture: (1) an unwise adoption and adaptation of discoveries which seem to confirm the sacred statements; (2) an unworthy fear that any truly scientific result can be adverse.

These dangers may be turned into deliverances. It is not long since the sciences were mere aggregations of empirical knowledge. Astronomy could hardly be called a science in the days of Hipparchos, seeing that physics did not begin, as a science, till Galileo discovered the law of falling bodies. Chemistry began two hundred and seventy years later, when Lavoisier, discovering the true principles of combustion, overthrew the doctrine of phlogiston. At the end of the eighteenth century biology began, Bichat pointing out the relations between the functions of organs and the properties of tissues. Sociology is not yet a science. Scientific religion will not be completed until the whole physical and psychical nature of man, physics and metaphysics, history and revelation, the natural and preternatural, are regarded from the highest point attainable by human nature. Meanwhile, assured as we are by the co-ordination of all our faculties, that the religious sentiment will find as great, or even greater satisfaction in the future than it has in the past, and because the recognition of a Power which is beyond humanity, and upon which humanity rests, will become, by the advance of science, a scientific verity; it is well to remind the fearful that religion is not "a polity de

novo," but built on the concrete facts of past ages. It views the individual in his relation to the Supreme, who is manifested in creation, revelation, providence, history. It sanctions, sanctifies, and renders possible, the true morality which ought to govern men in relation to their fellow-creatures. Not only so—religion and morality united condemn whatever hinders or mars physical and spiritual completion of life; give the aspiration—the noblest we can entertain—for complete fulness of life; and yield philosophic explanation of the marvellous range of human sympathy, and of irrepressible yearnings after the divine. Hence, concluding that the divines and sages of the past were neither knaves nor the dupes of knaves but genuine philosophers; that they not only made the best use of such implements of research as they possessed, but embodied in the spiritual organization of creeds that alone, of all the things in the world, which was found capable of holding society together in troublous times, or of giving consolation to men in their affliction; we are preserved from hasty and unwise use—even as we have no servile dread of scientific discovery. The soul or life of this religion and morality is faith in a guiding and beneficent God, who inaugurates a better state of society here as preparation for a more glorious future by effecting not merely change of opinions; but, specially, change and improvement of heart.

St. Augustine cried in amazement, "Wondrous depths of Thy words! whose surface, behold, is before us inviting to little ones; yet are they a wondrous depth."[1] The amazement of Christians is not less in these days: as the Book grows more venerable in antiquity it becomes more reverend in authority. The consideration of physical truths proves that Moses—living in barbaric time, as to science—was certainly wise; and that the message which he received from God is undoubtedly true. Scientific difficulties, far from casting doubt on the faith in which we were nurtured, confirm, in their explanation, its Divinity. If the science of one age could fathom all depths, the Book, revealing those depths might be wholly of man—a production of the land of Egypt and house of bondage; but knowledge opening new domains

[1] Conf. lib. xii.

for wisdom to possess, finds new meaning shine as light out of a dark place. The old words, the old thoughts, remain ineffaceable: but the child of the flesh is also a child of the Spirit—God's witness to the human heart. Moses dwelt in a land of sun-worshippers, and could not forget the sun; amongst men who laid stress on the letter of nature's book, and rendered every symbol of the Divine a myth of some special divinity—a god of day and light, a god of night and darkness, a god of water and a god of fire, a god of good and a god of evil, god warred against god; nevertheless, Moses restored the knowledge of the One true God. In laying the foundations of this higher knowledge, he advanced from nature to nature's God, and from the seen to the unseen.

"All experience is an arch wherethro'
Gleams that untravelled world, whose margin fades
For ever and for ever when I move." TENNYSON.

Impartial men will allow, that if Moses wrote such an account of creation as can stand the investigation of accurate modern science, he was one of the most wonderful men that ever lived.

Christians claim more for the account: they assert that the formula of Creation does not instruct men in science, yet contains even all which it revealeth not: is a formula, with mystery of deep within deep, for the profound; but to the simple-hearted as a clear lake wherein the face answering to their face is the Human Face Divine. Such a formula, wherein the problem to be solved is the equation of all things and nothing, of the finite and Infinite, of time and Eternity, must be a Divine product. No other intelligence, not even that of the highest archangel, knew or saw the primal generation; and no creature can understand or describe that genesis by which worlds—relatively eternal and infinite, both as to the past and the future—begin, continue, and end: the end issuing in the birth of new worlds evermore.

This formula, being for men, is to be regarded in human fashion. It reveals a process in which God, everywhere and in all things, everlastingly calls forth existences to live, move and have being in Him. To high intelligence, moreover, the process or plan will stand out in complete result, somewhat

as it is in presence of the Eternal, absolutely apart from time. Between these two conceptions of creation—one of infinite extent and eternal duration, the other as a gathering of all into a comprehensive "Now"—will intervene all that variety of representation ranging from a glance, as by instantaneous flash, revealing a vast panorama, to that same figurative display, such as we possess in Genesis, when enlarged by scientific conception. Whatever faculties our nature has received are to be used as lights to search these deep things of God; that we may find within the allegory, figure, symbol, parable, the foundation of that higher knowledge and conviction—

> "Our destiny, our being's heart and home,
> Are with Infinity, and only there."

Thus searching the Divine Narrative, we find that events are as the rise and fall of a curtain, day and night cast light and shadow, voices and commands order the process, the formless takes shape, a long hidden beginning is revealed, the Spirit of God shines on the face of a great deep, and chaos passes into Creation. There are shinings—light; openings—firmamental expanse; gatherings and flowings—the great deep; rising as from watery womb—the new land; life germinating—afterwards to grow in power beneath sunny beams. We can conceive that this whole process might pass before the spirit of Moses in a series of days—a thousand of years to a day; or a day as a moment. The element of time is index, not computation: every day being yesterday's child and to-morrow's parent. The creations of God in plant and fish, in bird and mammal, appear not so much near or wide apart, as standing out with distinctness.

We are bound by the same analogy to regard the order or progress as not necessarily in a straight line; but, possibly, that described by those complex curves in which are contained the progress yet continual return of the heavenly bodies in their vast career. Expositors of the Divine Procedure are not to bind Scriptural narrative in those cords of exact order and sequence which science imposes as to her own essays and experiments. Revelation states why God made the world, science endeavours to find how God made the world. Revelation is for moral purpose, science for physical investigation.

At a time when men worshipped the sun as Lord of Life—as did the Egyptians, and as do some Materialists now—that moral purpose is best served, and men are best instructed, by declaration that they live not by sun-power, but by God-power. On this moral ground we vindicate the insertion of life as precedent to acknowledgment of the sun as ruler: so that should our scientific argument fail to convince, the Divine Act may nevertheless stand by its own integrity.

Try the scientific investigation.

Time has surprises and revenges. We have seen how light shone out of darkness; and now we shall find that the sun is not a naked and terrible wilderness of tempestuous combustion, but affords in its consideration a well-spring of intellectual delight.

The Sun's Origin.

Till of late it was tacitly assumed that the sun did during the past, and will through the future, emit an unfailing amount of light and heat. All this is now abandoned. We know that, in whatever shape energy manifests itself in the world, it must have existed previously under another shape. Solar radiations are the changed form of some other energy: possibly that by which the matter or nebulous substance of the sun was drawn to his centre of gravity from a space extending indefinitely beyond the outermost planet. A mass of coal, the size of the sun, would only suffice to give so large an amount of heat for five thousand years. We have, therefore, to accept the hypothesis of the falling together, from widely-scattered distribution in space, of the matter which now forms the various suns and planets. As the mass of our own sun aggregated and condensed, heat grew with the force of impact, and the luminous atmosphere was of gradual formation.

According to another and more probable theory, possibly the rarefied gaseous condition was caused by excessive temperature, and condensation began with the cooling and contraction of the mass. Or, if we unite both theories, then the solar system was evolved by the processes of contraction and accretion; and, according to the theory of Laplace, the planets were fashioned in the order of their distances from the sun,

the remoter being first formed. In the drawing of cosmical matters to the sun, the vaster the distances the more violent the impact. "The rush of matter which we now recognize affords, perhaps, but the faintest indications of the amazing conflicts in which our system had its birth. Tracing back the history of that system, we seem to recognize a time when the sun's supremacy was still incomplete, when the planets struggled with him for the continually in-rushing materials from which his substance as well as theirs was to be recruited. We see him clearing, by the mighty energy of his attraction, a wide space around him of all save such relatively tiny orbs as Venus and the Earth, Mars, Mercury, and the Asteroids. With more distant planets the struggle was less unequal. The masses which flowed in towards the centre of the scheme swept with comparative slow motion past its outer bounds, so that the subordinate centres there forming were able to grasp a goodly proportion of material to increase their own mass or to form subordinate systems around them. And so the planets, Jupiter and Saturn, Uranus and distant Neptune, grew to their giant dimensions, and became records at once of the sun's might as a ruler—for without his overruling attraction the material which formed these planets would never have approached the system—and of the richness of the chaos of matter from which his bulk and theirs was alike derived. Nor is the consideration without a mysterious attraction, that in thus looking back at the past history of our system, we have passed, after all, but a step towards that primal state whence the conflict of matter arose. We are looking into a vast abysm, and, as we look, fancy we recognize strange movements and signs, as if the depths were shaping themselves into definite forms. But in truth those movements show only the vastness of the abysm; those depths speak to us of far mightier depths, within which they are taking shape. "Lo! these are but a portion of His ways; they utter but a whisper of His glory."[1]

Truth is stranger than fiction and excels romance. Many ages back, in the immeasurable swoop of the past, an enormous nebulous mass existed at and around the place

[1] "Genesis," p. 151: Professor Lange.

now occupied by the solar system. This mass, obtaining swift and vehement rotation, assumed a somewhat globular shape. Huge rings of nebulous matter were integrated during successive ages of spinning and revolving. These again broke into portions — so are satellites accounted for—while certain whiffs or puffs gave birth to the eccentric comets. The array of sun and planets, the pomp of all material worlds, are a procession and gathering from the unseen to the seen in infinite space. Their duration, compared with eternity, is as the flight of birds into the horizon,—to pass out again and be no more seen.

The Sun's Age.

"It has never been maintained that the matter of the sun was created or even organized on the fourth day."[2] Theologians hold that the development of the solar system includes all terrestrial arrangements. The formation and operation of the sun and of the earth were co-ordinate and partly contemporaneous. The sun, the earth, and other planets, being for one another, their whole substance formed part of that universal cosmical arrangement which is described Genesis i. 1. Dr Buckland, p. 27 "Bridgewater Treatise," observes, "We are not told that the substance of the sun and moon was first called into existence on the fourth day. The text may equally imply that those bodies were then prepared and appointed to certain offices of high importance to mankind, to give light upon the earth, and to rule over the day and over the night, to be for signs, and for seasons, and for days, and for years. The fact of their creation had been stated before in the first verse." Against this it may be urged, "The text says the sun was made on the fourth day, not made to appear. Just as God made the firmament, made the beast of the earth, and made man, so did He make two great lights and the stars. There is an end of all ingenuousness in interpreting Scripture, if we foist in one of these examples a meaning not borne in any of the others." The reply is simple and convincing—The word "made" is not to be strained in the least, and when we say it means, not the making of globular and opaque masses in the depths of space, but the making of visible lights

[1] "The Sun:" R. A. Proctor.

as they appear moving in the sky, that meaning is correct and natural. If, moreover, our science is correct as to the progressive condensation of the sun, the luminous atmosphere would be cleared gradually during the sun's process of integration as a revolving light." The development of the earth is an analogue of the development of suns and stars. As the earth condensed, so the sun condenses. The condensation of the sun from the original nebulous mass can be calculated. Professor Helmholtz gives a formula.[1] Work of condensation $= \frac{3}{5} \cdot \frac{r^2 M^2}{R m} g$. The mass of the sun is M, the mass of the earth is m; the sun's radius is R, the earth's radius is r. Taking $M = 4230 \times 10^{27}$ lbs., $m = 11{,}920$ lbs., $R = 2{,}328{,}500$ feet, and $r = 20{,}889{,}272$ feet, we have for the total work performed by gravitation in foot pounds,

$$\text{Work} = 3. \frac{(20{,}889{,}272{\cdot}5)^2 \times (4230 \times 10^{27})^2}{5 \quad 2{,}328{,}500{,}000 \times 11{,}920 \times 10^{21}}$$
$$= 168{,}790 \times 10^{36} \text{ foot pounds.}$$

The heat, thus produced, would suffice for 20,237,500 years; and the quantity of heat given out, which previously existed as original temperature was 49,000 and 50,000 years' heat; making in all 70,087,500 years' heat. This represents the total amount of heat given out since the mass began to condense. Mr Croll says, "Let us assume that by the time that the mass of the sun had condensed to within the space encircled by the orbit of the planet Mercury (that is, to a space having, say, a radius of 18,000,000 miles) the earth's crust began to form; and let this be the time when the geological history of our globe dates its commencement. The total amount of heat generated by the condensation of the sun's mass from a sphere of this size to its present volume would equal 19,740,000 years' sun-heat. The amount of original heat given out during that time would equal 48,625,000 years' sun-heat, thus giving a total of 68,365,000 years' sun-heat enjoyed by our globe since that period."[2] If the sun's gravity is greatly increased at the centre, the quantity will be consider-

[1] "Phil. Mag." § 4, vol. xi. p. 76 (1856). Also in "Climate and Time," p. 348: James Croll.

[2] "Climate and Time," p. 352: James Croll.

ably more; but there is no warrant for anything like the period demanded by some geologists, and the general conclusion arrived at by measurement of the sun's heat is that one hundred millions of years amply suffice for condensation of the nebulous mass into the present form.

A process of condensation has not only taken place in the sun, but in all members of the solar system. There has been advance in every one from the gaseous to the liquid, from the liquid to the solid state, to be followed by extinction. There was a time when the sun did not give light in the manner now given,—a time when the earth, even if light were given, could not behold it. There was a time when all the visible glory was invisible, —a time when nature, as now known, was not; so that in a Source beyond nature is nature's origin to be found. Worlds precede worlds in time, as worlds lie beyond worlds in space.

Turn to the account:—"God made two great lights, the greater light to rule the day, the lesser light to rule the night. He made the stars also; and God set them in the firmament of the heaven, to give light upon the earth." The stars seem mentioned lest they should be accounted uncreated. Sun, moon, and stars are classed according to their apparent magnitude and importance. The word "made" is more formative than the word create. It is used for dressing, arranging, making ready. The calf was *dressed* for Abraham's mysterious visitors, and the cakes were *made* of meal (Gen. xviii. 6, 7). The same Hebrew word, used for dressing, making, crowning, informs us that the sun was dressed, made, crowned ruler, to give light on the earth. By the time earth and water were separated, and dense vaporous clouds rarified, the earth's mass attained a measure of consolidation, and began to exhibit vital power in lowest forms of vegetable organisms; the sun, clearing the photosphere, sent rays both of light and heat through the vast pressure of his own vapours, and became lord of the day.

> "Day arises that sweet hour of prime.
> Thou sun, of this great world both eye and soul,
> Acknowledge Him, thy Creator, sound His praise
> In thy eternal course, both when thou climb'st,
> And when high noon is gained, and when thou fall'st.

Moon, that now meet'st the orient sun, now fliest ;
With the fixed stars, fixed in their orb that flies ;
And ye five other wandering fires that move
In mystic dance, not without song ; resound
His praise, who out of darkness called up light."

Paradise Lost.

The Sun's Physical Constitution.

The actual density is about one-fourth that of the earth, or a little greater than the density of water.[1] The tremendous heat, whatever pressure the gases and vapours are subject to, renders a large solid or liquid nucleus improbable ; and we must regard the sun as, in the main, a gaseous body. Around it is no permanent or solid crust but a nearly continuous liquid envelope continually pierced by blasts and jets from within. This great gaseo-liquid mass, swaying our system, is compressed towards the centre, but hardly any definite theories can be adopted concerning its condition. The attractive and repulsive forces are such, the elements exist in forms and quantities with which we are so nearly unacquainted, that when one difficulty is removed from our understanding it gives place to another greater than itself. Possibly, the sun's envelope cannot, in any ordinary sense, be counted a crust at all ; but as the vaporous globe is in the presence of the cold of space, there is necessarily a process on the outer surface corresponding to the formation of clouds in our skies. The vapours composing them are chiefly metallic elements, which condensing may descend in sheets of fire, and form a nearly continuous liquid envelope, through which the central imprisoned gases are erupted with great violence. "The sun, according to this view, is a gigantic bubble whose walls are

[1] The sun is 1,260,000 times larger than the earth, and 882,000 miles in diameter. More than 1,200,000 earths would be required to form the substance of one sun, and the weight or mass is 300,000 times greater than that of the earth. Our sun is not a large star compared with others, for Sirius is equal in bulk to more than 3000 suns. The surface of the sun is about 2,284,000,000,000 square miles, there are 3,097,600 square yards in every square mile, and on every square yard a heat is produced equal to that which would be caused by burning on it six tons of coal an hour. The impact of matter falling into the sun merely from the earth's distance, would give 6000 times the amount of energy which would be produced by mere burning. The sun travels at the rate of 154,185,000 miles the year. His mean distance from the earth is 91,430,000 miles ; rotation on the axis occupies about 25·38 days.

gradually thickening, and its diameter diminishing, at a rate determined by its loss of heat. It differs, however, from ordinary bubbles in the fact that its skin is continually penetrated by blasts and jets from within."[1]

Sir W. Herschel viewed the sun as a solid globe, around which lies an atmosphere of complex nature. He thought that the real body of the sun was neither illuminated nor heated very greatly. "Whatever fanciful poets may say in making the sun the abode of blessed spirits, or angry moralists devise in pointing it out as a fit place for the punishment of the wicked, it does not appear that they had any other foundations than mere opinion and vain surmise; but now I think myself authorised, upon astronomical principles, to propose the sun as an inhabitable world." Sir John Herschel, the son, took a wholly different view as to the coolness of the sun; and, incredible though it seem, regarded certain bright objects, shaped like willow leaves, lying athwart and across each other, as the immediate sources of the solar light and heat. He says, "We cannot refuse to regard them as organisms of some peculiar and amazing kind; and though it may appear too daring to speak of such organisations as partaking of the nature of life, yet we do know that vital action is competent to develope at once heat and life and electricity."

The sun's surface has not only spots which have a central part, and a fringe less dark; but also contains certain bright streaks in the neighbourhood of the spots—these by some are called faculæ. "The sun-spots are really hollows or cavities in the solar atmosphere where the temperature of the glowing gases has been reduced."[2] The spots are said to be confined to two definite zones, extending about 35° on each side of the equator. The spot zone is a scene of solar tornadoes of white-hot hydrogen, which blow with such fierceness that, compared with these, our most destructive storms are mere summer breezes. The spots are certainly depressions of greater or less depth, and the light received from the umbra of a spot shines through absorbing vapours. "A great difficulty lies in

[1] "The Sun a Bubble:" R. A. Proctor.
[2] "Spectrum Analysis," p. 263: Henry E. Roscoe.

the fact that we have no clear evidence to show whether the sun-spots are formed by forces acting from without or from within, . . . whether the seat of that action which leads to the formation of a spot lies below or above the level of the photosphere. . . . As to the prominences, it seems to be demonstrated that some are mere clouds in the upper regions of the solar atmosphere, while others are due to some form of eruption, and only assume the cloud form after the eruption which gave them birth has ceased."[1] There are bridges, arcs, stalks, leaves, and veils of clouds most intricate in structure. The wildest and most fantastic variations take place, renewals of fresh forces with scenes of tremendous tornadoes, swift rushes of glowing vapours and cyclonic motions. The least spot, perceived with the most powerful telescope, must have an area of fifty thousand miles; those visible to the unaided eye must be enormous. The largest spot recorded had a greater breadth than 143,500 miles. We are told the spots sometimes burst in pieces, like a piece of ice dashed on a frozen pool, and disappear in a moment.

The eruptions, which occur at all times, are vast explosions, seeming to come from some twenty thousand miles below the edge of the sun's disc, and extending many thousands of miles in every direction. There are brilliant silver copper and ruby-coloured coruscations. Their velocity has been known to exceed two hundred and fifty miles a second. The eruptions are of glowing hydrogen, and other vaporous elements, through an atmosphere of hydrogen.

Coloured prominences consist of glowing gas of various tints and forms—their origin is still a mystery. The sierra, or rugged line of projections, are ranges of red and other coloured flames, now called the chromosphere. The whole disc of the sun is much marked with roughness like an orange, and some of the lower parts of the inequalities are blackish; the faculæ are ridges of elevation above the rough surface, and sometimes next to a spot will be a protuberant lump of shining matter.

Many metals exist in the sun. Gold, silver, platinum, lead, mercury, so far as we know, have not been found. The presence of sodium, calcium, barium, magnesium, iron, chromium,

[1] "The Sun," pp. 438, 439: R. A. Proctor.

nickel, copper, zinc, strontium, cadmium, cobalt, hydrogen, manganese, aluminium, and titanium, has been demonstrated. Very lately the presence of oxygen has been asserted.

The vapours of the sun's globe are chiefly metallic, and they condense into clouds pouring down continually molten metals. Low down, approaching the intense heat from the sun's interior, where they are revapourised, the metallic rain descends in perfect sheets, forming a nearly continuous liquid envelope.

The surface of the sun is exceedingly complex. Analysis of spots shows three envelopes within the photosphere: the penumbral fringe, the dark umbra, and the so-called black nucleus about 10,000 miles below the photosphere. The photosphere itself is a fourth solar level. The fifth is a shallow atmosphere discovered by Young, extending three or four hundred miles above the photosphere. Sixth, the sierra, about eight or ten thousand miles. Seventh, the prominence region, extending to a height of thirty or forty thousand miles, with occasional extension to more than a hundred thousand miles. Eighth, the inner brighter corona, from two to three hundred thousand miles, expanding in places to four or five hundred thousand miles. Ninth, the outer radiated corona, jagged in outline and extending fully a million of miles from the visible glowing surface of the sun. All these envelopes are themselves multiple; and when it is added that the outer corona is but the inner part of a solar envelope, or appendage, with outermost limits lying altogether out of ken, we see what a complex subject of research lies before our astronomers.

The sun has almost a counterpart in the planet Saturn, whose splendid architecture displays the fashioning power of the great laws of the universe. The beauty of the system, the marvellous gigantic rings, the delicate varieties of colours in the rings and in the planet, the singular problems suggested by their magnificent size, fascinate the observer. If the vast belts are not cloud-masses formed by the sun, their real origin must be in some action of the planet's own mass. The heat of his surface may cause currents of vapour to rise continually; and, on attaining the upper regions of his atmosphere, they are condensed in the form of a cloud. "A similar peculiarity exists in the case of the sun. Indeed a somewhat

surprising resemblance exists between Saturn and the sun, as regards many important characteristics. The planet, like the sun, is of low specific gravity—very far lower than the earth's; as the sun has eight primary attendants, so Saturn has eight satellites; and as the sun has his attendant disc of minute bodies (seen in the Zodiacal light), so Saturn has his ring system, in all probability, of multitudes of minute satellites travelling in independent orbits around him. Is it not possible that the relation necessary to make the analogy complete may be actually fulfilled, and that Saturn is a source whence heat is supplied to the orbs which circle around him."[1]

The analogy may be added to by a further fact—Jupiter, with his dark bands, seems now to be in the same state as was our earth. His cloudy shifting streaks; and the appearance, at times, as of mountains or openings; may be inaugurating new days and nights in that far-off mighty planet.

It is not necessary, for those who believe that all things are of God, to adopt any scientific theory as final. Mayer and Thomson maintained that the sun's heat, compared with which the fiercest fire of a mass of white hot iron is cold as ice, is sustained by the continual infall of cosmical bodies. Helmholtz supposes that gradual contraction of the solar orb is the mainspring of solar energies. Secchi believes that the fund of force lies in the union of the sun's own elements in chemical combinations. Sir John Herschel said, that mayhap the vital energies of monstrous creatures are the source of the luminary's might. The facts themselves are so wonderful that even a sober explanation must appear wild, and discovered realities are more sublime than any fictions that were ever addressed to the imagination.

We need force and firmness in our character to preserve us from bewilderment, for as the conceptions of natural science beggar those of Milton, so our views of God's wisdom and might fill us with unutterable awe. The natural philosopher says,—"To nature nothing can be added, from nature nothing can be taken away." The Christian replies,—"Not so: waves change to ripples, and ripples to waves; magnitude may be substituted for number, and number for magnitude; asteroids

[1] "Essays on Astronomy," p. 99: R. A. Proctor.

may aggregate into suns, and suns transform their powers into plants of beauty and trees of renown; but the flux of power, eternally the same from God, is, in nature, of ever varying manifestation. He conserves the energy, makes it roll in celestial and terrestrial movement with music through the ages, here in mechanical force, there in chemical activity, elsewhere, in vital influence, and ever shifting them. So far from there being but one creation, by which the visible came forth from the invisible, and one end, by which our earth will pass away; in the realms and eternities of God are many creations and many dissolutions. Our Father worketh hitherto, and will work; and the new heavens and new earth, promised to us in connection with our Faith and the Redemption that is in Christ Jesus, may not only be joined to the physical destinies of other worlds; but possibly have a moral and spiritual influence in realms of which our mind hath not even thought.

The Sun's Rule.

He draws to himself all such cosmical matter and bodies as come under his exclusive influence, either by leaving the domain of some other star, or on account of his own motion through space. These do not all remain with him; but, after paying their respects, return to the sidereal depths to be attendants on other suns and stars; performing their own functions in many worlds. Around him are millions of millions of bodies of varying velocities in different directions; clouds of cosmical atoms shifting and changing, aggregating here, segregating there; but, as a clustering solar appendage, permanent, and forming an aureola of tremendous dimensions and startling magnificence. The meteors encountered by our earth every year are upwards of 2,700,000 visible to the naked eye; including shooting stars, only seen by telescopic aid, the hypothetical sum is 146,000,000,000. The space between the earth's orbit and the sun cannot be less rich; in fact, there must be an increasing aggregation of meteoric matter with nearness to the solar globe.

By the exercise of his mighty attractive influence, he controls the force which would drive them far out into space from the influence of his lighting, heating, and actinic influ-

ence. So perfect his government, that the processes of slow change take place within limits, and the continual variations produce permanence in paths ever varying around him. By slowly-exerted influence, he changes the eccentricity of our earth's orbit; and causes the terrestrial equinoxes to circuit the ecliptic in their grand procession of 25,868 solar years. By this, continents become oceans, and seas dry-land; one hemisphere and then another supplies fruitful fields; activity follows rest, and rest activity; so, through many ages, this globe has been, and will continue to be, a fit abode of life and beauty.

In one sense the sun's sphere of influence includes all space, but for practical purposes we now regard it as limited and definite. His power is 315,000 times greater than the earth's. It might be supposed that a very vast increase of velocity is needed to change our periodic revolution; but if the earth's speed were raised from its actual rate, 18·2 or 19 miles the second, to about 25·7 miles the second, we should be carried thenceforth further and further away from light and life. Still rotating, day and night still succeeding, the orderly sequence of the seasons would be displaced by continual diminution of solar light and heat; and a cold more intense than that of the bitterest arctic winter would bind all things in everlasting frost. So true is it, the lights in heaven are for signs and seasons, for seed-time and harvest, for summer and winter.

The sun rules all the vapour of our atmosphere, lifting it up, and then casting it down as rain or snow. The mechanical power of every river in the world is drawn from the sun; the energy of the winds, the growth of trees and vegetables, the support of animal life, are all from him. The blood in our veins—that oil of the lamp of life, the work of our muscles, the oxidation which supports the heart's action—without which it would be utterly consumed by its own action in eight days, prove that we are children of the sun. In tracing out all these powers to their source, we come to one single power—that from which every vital energy proceeds, the sun. He is the natural agent, and as the knowledge of nature is brought to bear upon Scripture, it becomes as easy for men

to see the Providence of God in the creation and ordering of the world, as in startling and miraculous occurrences.

For many æons the sun and our earth were "a fluid haze of light;" and then again, for other æons, our earth, like the sun, was a globe instinct with fiery heat in which no life could live after the manner of life now known. The potential germs of life might have been present in the midst of the fire, but only after periods infinite to our conception could life, such as we know it, or in the remotest degree like it, begin to exist on the earth: though it is probable, from the existing fact that seeds and plants, in order to germinate, must be placed in darkness, this being the case even with those plants which cannot flower and fruit until they receive the solar beams and power, that the living principle began to germinate ere solar beams shone with great light on the earth. The sun was hotter formerly than now, but the zodiacal light and corona may have had particles not luminous which hindered the shining forth of great light. In fact, it may be that when the sun was giving forth most heat it was simultaneously raising the greatest amount of obstruction to the propagation of radiations from its surface.

This throws light on the Divine Narrative. Grass, herb, tree, are representative words for all vegetation; and grass comprises that low order, called cryptogams, or flowerless plants. The earliest may have been like those fungi which are found in mines, quarries, and gloomy or dark places of the earth. Herb and tree stand for that growth of flowering plants, including modern cereals, fruit and forest trees, which now adorn the earth; but probably did not exist until required for the nourishment of animal life. We may reasonably conclude that, lord of earthly life as is the sun, creative energy waited not for his manifestation on the fourth day; but that in the water and on the land, even before the sun's face was cleared from the battle and smoke of early cosmical struggles, life became rooted in the ground and floated in the waters; and when, with clear face, the monarch surveyed the earth, many other forms of life sprang up to be gladdened with his smile.

The Sun's Path Through Space.

As knowledge and piety extend the horizon of our view, the world enlarges to our contemplation; we travel beyond the sphere of sun, moon, earth, planets, and enter new firmaments to behold other suns and stars of greater and lesser splendour. The vast system, of which we are members, is hasting on with meteors, comets, satellites, asteroids, comets, sun, from the southern rich region of stars—the neighbourhood of Canis Major, Columba, and Lepus, to the northern rich region—where the chiefest splendour is gathered in Cygnus. We are speeding along a relatively barren path, from a rich past to a glorious future, at a rate of one hundred and fifty-four millions one hundred and eighty-five thousand miles the year; we are circling a centre in the direction of Alcyone, a star of the Pleiades, of which Job (xxxvii. 31) said long ago, "Canst thou bind the sweet influence of Pleiades?" Round some central sun, or central void without any preponderate mass, or in a great vortex-ring, we move as parts in a scheme of movement too wondrous and complicate to be as yet interpreted by astronomers, and we complete the course in about eighteen million two hundred thousand years.

As the earth and other planets are carried on, their orbits continually advance; the earth, as beheld from the sun, is but a dust-mote in his beams; and the actual path, year by year, is through fresh space. Viewing the sun, as among other suns, and the planetary orbits, as seen from the fixed stars, those orbits are little more than a point, and the sun is invisible. What unknown possibilities lie in that measureless extension of space where worlds are sprinkled as dust of gold, for the display of intellectual and moral life! Our sun and his fellow suns are connected with groups of minor suns, with clusters of star-dust, with masses of star-mist, with whorls and convolutions of nebulous matter, sometimes combined in vast spherical gatherings of worlds. There are orbs lying in such close order that we think great brilliancy is in those heavens; but, after stricter examination, they are found wide apart as the inconceivable distance between our sun and his nearest fellow. Further off still, are stars whose rays take thousands, perhaps millions of years to reach the earth. The arrangement is of striking order, and the possi-

bility of it having sprung up by chance is so ridiculously small that Quetelet calculates it is as nothing. There is a multiplicity of worlds in infinite space, and a countless succession of worlds in infinite time, with point or base of gravity regulated by the weight and motion of all. Great and glorious is the Garden of God. The suns are planted in flowering beds of many splendid colours. The planets interweave in sparkling germination, various foliage, blooming fecundity of borders. Dark suns, weird places, cavernous chaotic regions, shadow forth the desolation of eternal wintry fields. There are ridges and clusters, rows and shelvings, with spirals and streams, in celestial depths where are disclosed the signs of as yet unthought of laws. "I shall maintain it all my life, whoever says in his heart there is no God, and makes use of a different language, is either a liar or a madman."[1]

Scripture holds closely to mundane affairs, yet the very ground on which religion and morality are based, is that we move in a wider circle than the physical; that there are spiritual beings, good and evil, that enter our firmament and concern themselves with the destiny of our race; and that we, after a rational service in duty and trial, shall enter a vast congregation of pure spirits, who are further within the circle of Divine Power, and nearer to the manifestation of Divine Glory. Meanwhile, God guides us by His hand, and in His heart has sympathy. Life's trials cast down, but not destroy; blinding lightning may rend the firmament, yet awake no fear; and sickness, touching our body with premonition of the grave, brings conviction that we shall live again. Like the suns and stars, kindled into splendour from previous worlds, our restored spirits, with frames refashioned out of former elements and purified, will evermore live on, and find a starry pathway to the Eternal Throne.

Thoughtful men studying the Sun's Path Through Space, Rule, Physical Constitution, Age, and Origin, receive a deep impression that the Divine account, the simplest in the world, is not vague nor indefinite; but startling, grand, abrupt. There is an appearance corresponding to our own limited aspect of

[1] Rousseau, "Emilius," vol. ii., p. 230.

nature, in words and times agreeing with our ignorance and mortality; but possessing an inner spirit, revealing powers of the world to come.

Marvellously strange is human perversity! The pomp of heaven is made a plea for clothing the earth with poor garments, and the Father's boundless wealth a reason that we should expect nothing. Forgetting that if a narrative, like that of Scripture, bristling with apparent contradictions, startling and bold in a sturdy contempt of our confidence in human will and wisdom, is found to agree with accurate science, the Book must be of God; an attempt is made to turn even God's greatness against us. We are asked—"Of what consequence can men, their pleasures or their pains, be to Him in whose sight all the worlds our eye can see are less than a speck in infinite space?" Thus those who charge the Bible with narrowness, pervert the splendour of God into a plea that He is too great to love mankind. The Being whom they profess to hallow is made less wise, less good, less wonderful, by the assertion that He cannot and will not visit us. Why should our reason be less firm in structure, or analogy concerning this be entitled to less confidence, than when we consider smaller things? If the incalculable multiplication of worlds, and the necessities of a rule that is infinite, hinder not the fashioning of a moth's wing, so that it possess a very firmament of beauty, why should not the All-good and Holy devise a plan for rendering us good and holy, in a manner as far exceeding human thought and merit as the elaborate many-chambered houses for tiny and invisible life transcend our comprehension?

The philosopher delights to show that a grain of sand on the shore of a sea, and a thought in the mind of a child, are bound by a law which cannot be broken, with a past that is infinite and a future that is eternal. The Christian rejoices to know that God has a plan for every man—that the provision for a soul's salvation is infinite, is connected with worlds and times, transactions and interests, surpassing knowledge. To God, in a human sense, is no such thing as absolute size. There is relative greatness and small-

ness—nothing more. To us things appear small when scarcely seen by the naked eye; very small when a powerful microscope barely suffices to render them visible; and the space between us and a fixed star is enormous as compared with that between the earth and sun; but there is absolutely nothing to show that a portion of matter, which even in our most powerful microscopes is hopelessly minute for investigation, may not be complex as the stars that exceed our sun in magnitude.

In the same manner may the charge be met that the Bible counts our earth the centre of the world, and man as the hinge of universal destiny. Our littleness contains a very wonderful greatness: though we have put away the arrogant notion that human existence is the central era of time, as we have laid aside the error that our solar system is central within the universe. There seems no centre, nor are there any limits; rather the centre is everywhere, the circumference nowhere; and the human period is scarcely a ripple on the ocean of time. God, nevertheless, in condescending to us, has so elaborated our thought that we think as if He thought but of us, and had made our destiny His only care. This is not, on our part, wholly erroneous; for, to us, we and our world are indeed a centre from whence radiates a whole infinity. We are truly by creation, and yet more wonderfully by the Plan of Salvation, connected with a system that, materially and spiritually, arrays around it height and depth, length and breadth, the infinite past and the infinite future. The actual discoveries of science make possible, if not probable, all that comes within the compass of analogy. We can only look at the dial-plate of nature,—the forms and semblances of things; but even our present faculties enlarged would be able to inspect the wheel-work and springs; hence our belief is warranted that the seed of power within us, our intuitions, which already grow so as somewhat to penetrate mysteries seeming impenetrable, may be capable of enjoying vastly more of the inexhaustible wealth of Infinite Intelligence (1 Cor. ii. 9-15). If this be so, our earth is a centre of wonders, and on the hinge of our life revolves a surpassing destiny. The universe is all aglow with the lamp-light and hearth-light of our Father's

House. Life seems to many as the bubble of a solitary pool come up to look at the sun,—bubble clothed about with tender fibre of mortal hue, to float over the glowing ripple, hither and thither, who knows? But the bubble bursts; it has come in contact with some weed or spray, and the crystal sparklet flies. Whither? We say, "To be with God through Jesus Christ our Lord." Believe

> "That nothing walks with aimless feet;
> That not one life shall be destroy'd
> Or cast as rubbish to the void,
> When God hath made the pile complete.
>
> "That not a worm is cloven in vain;
> That not a moth with vain desire
> Is shrivel'd in a fruitless fire,
> Or but subserves another's gain."
>
> TENNYSON.

STUDY XIII.

DAY V.—FISHES, REPTILES, BIRDS.

"The natural and moral constitution and government of the world are so connected as to make up together but one scheme: and it is highly probable, that the first is formed and carried on merely in subordination to the latter, as the vegetable world is for the animal, and organized bodies for minds."—BUTLER'S *Analogy*.

IF we stood in space, far off from the solar system, we should see the worlds as a distant gleam. If then, standing not so far off, we beheld the light and motion of the planets and satellites, we might think that all matter was alike, all motion of one kind, and that both existed according to some simple mechanical and chemical laws. On still nearer approach, seeing the world's living things, we might conclude, in the absence of evidence to the contrary, that some law of invariable causation was absolutely universal. Alighting on the earth, among men, we should discover that nature spoke to all, and separately to each; that what every man heard he set down in feeling and thought, so that the symbols of his own experience represented the order in nature, the arrangement, fulness and reality of life, even as a page of algebraic figures which can be read off into the variety and splendour of light: that to this personal equation, to these qualities for physical and metaphysical research—bringing tidings that the circle of the known is surrounded by an ocean from whose depths arise other lands of beauty—is added a greeting of the spirit encouraging to climb in contemplation to the Unknown —the Great Cause of all. Our conclusion then would be that infinite space existed for matter, which was much less than space; and matter existed for life, which was much less than matter; and life existed for mind, which was least of all, yet greater than all, and ruler of all.

Regard this world of matter, of life, of mind, as a mechanism driven by blind energy; such energy, unless continually restrained by mind giving it law, would break up the universe. We can think this out. The transfer of energy into things necessary for the existence of life, and to effect physical changes in the universe, "is on the whole a passing from higher to lower forms; and, therefore, the possibility of transformation is becoming smaller and smaller; so that, after the lapse of sufficient time, all higher forms of energy must have passed from the physical universe; and we can imagine nothing as remaining, except those lower forms which are incapable, so far as we yet know, of any further transformation. The low form to which all transformations with which we are at present acquainted seem inevitably to tend, is that of uniformly diffused heat. . . . . Now, when all the energy of the universe has taken the final form of universally diffused heat, it will obviously be impossible to make use of this heat for further transformation."[1] The worlds will be dark—dead—cold. This process, leading to chaos, enables us distinctly to say—"That the present order of things has not been evolved during the infinite past by the agency of laws now at work; but must have had a distinctive beginning."[2] This beginning must have been by other than the now visibly acting causes. The only way out of the difficulty is to take mind, matter, energy, as alike real existences. We know of mind by organism, does organism generate mind? The reply is—Organism does not even generate life, life certainly generates organism; organism therefore cannot generate mind which is the highest attribute of life; consequently, we must regard all physical phenomena as transformations of energy from the Unknown—the Eternal.

This brings us to life. The vitality of plant, of fish, of reptile, of bird, may seem no great thing; but if we consider that every little part of this organism has its own little store of energy constantly emptied and replenished; that the internal and external sources draw upon, and are drawn upon

[1] "Recent Advances in Physical Sciences," p. 20: P. G. Tait, M.A.
[2] "Recent Advances in Physical Sciences," p. 22: P. G. Tait, M.A.

by the whole arrangement of the world for harmonious working; the mechanism becomes very wonderful. Nor is that all—every portion of it is microscopically constructed, the excessively minute parts are in exquisite harmony with the grand plan of the universe, and we cannot but conclude, that if to destroy even one atom of dead matter the intervention of Deity is requisite, there must have been at the very base, at the initiation of life, an actual and a special interference of creative power.

Plato, one of the most thoughtful of ancient heathens, thus reasoned—"Was the world, I say, always in existence and without beginning? or created and having a beginning? Created, I reply, being visible and tangible and having a body, and therefore sensible; and all sensible things which are apprehended by opinion and sense are in process of creation and created. Now that which is created must of necessity be created by a cause. . . . . He put intelligence in soul, and soul in body, and framed the universe to be the best and fairest work in the order of nature."[1] Coming to our own day, Mr Darwin says—"To my mind it accords better with what we know of the laws impressed on matter by the Creator, that the production and extinction of the past and present inhabitants of the world should have been due to secondary causes like those determining the birth and death of an individual."[2] Very well, then, the natural had its origin in the supernatural, life and death are traced through secondary causes to Divine Will. Another student writes, that he may lead us "to the power of apprehending the unity which underlies the diversity of animal structures; to show in those structures the evidence of a predetermining will; producing them in reference to final purpose; and to indicate the direction and degrees in which organization, in subserving such will, rises from the general to the particular."[3] Here we have the initial fact, production, and the design of it: the initial fact rendered law possible, and the design bound that law, as an elastic band round the universe, making Providence to be both general and particular.

[1] "Timæus:" translated by Dr Jowett. [2] "Origin of Species."
[3] "Anatomy of Vertebrates," vol. i. p. v. Intr.: Owen.

As to the specific nature and continuance of life, the best arguments are facts given by accurate observers:—"It has been deemed no mean result of comparative anatomy to have pointed out the analogy between the shark's skeleton and the human embryo, in their histological conditions; and no doubt it is a very interesting one."[1] This analogy is not inconsistent with the observed tendency of offspring to differ from the parent; nor with the stranger fact—"This tendency and its results are independent of internal volition and external influences."[2] Thus we are led to the great truth—"Every species is such *ab initio*, and takes its own course to the full manifestation of its specific characters agreeable with the nature originally impressed upon the germ. A perch, a newt, a dog, a man, do not begin to be such only when the embryologist discerns the dawnings of respective specific characters. The embryo derived its nature, and the potency of self-development according to the specific pattern, from the moment of impregnation; and each step of development moves to that consummation as its end and aim."[3] "An orderly succession according to law, and also progressive or in the ascending course, is evident from actual knowledge of extinct species;"[4] but none can say why circulation in the embryo of lizard, of fowl, of beast, is like a fish in its simplicity, but far from being identical. "It is proved that no germ, animal or vegetal, contains the slightest rudiment, trace or indication of the future organism—since the microscope has shown us that the first process set up in every fertilized germ is a process of repeated spontaneous fissions, ending in the production of a mass of cells, not one of which exhibits any special character; there seems no alternative but to conclude that the partial organization at any moment subsisting in a growing embryo, is transformed by the agencies acting on it into the succeeding phase of organization, and this into the next, until, through ever increasing complexities, the ultimate form is reached."[5] The fact is established, the operation of deri-

[1] "Anatomy of Vertebrates," vol. i. p. 245: Owen.
[2] "Anatomy of Vertebrates," Intr., p. xxxv.: Owen.
[3] Owen: "Anatomy of Vertebrates," Intr., p. xxi.
[4] Owen: "Anatomy of Vertebrates," Intr., p. xxxvi.
[5] "First Principles," pp. 443, 444: Herbert Spencer.

vative secondary causes is due to a great master Principle: by whose will and power the waters swarm with swarms of living things, and birds fly above the earth:—

> "Young fresh blood . . .
> Keeps ever circulating still
> In water, in the earth, in air,
> In wet, dry warm, cold, everywhere
> Germs without number are unfurl'd."—*Faust.*

Living beings possess at least six leading characteristics.

1. Assimilation—the power of taking in external materials, and converting them into substances for building up fresh tissue and repairing waste. By this a living body grows.

2. Alteration—certain periodic changes, in definite order by which they lose portions of their substance and die: partial death is the accompaniment of all life.

3. Reproduction—living bodies have, directly or indirectly, the power of giving origin to germs which develop into the parent's likeness.

4. Motion—every living body is the seat of energy, by which the inertia of matter is overcome; is master of physical forces; and this power in man, wielded by intelligence, brings the dead matter of the universe into obedience.

5. The life of all living beings seems to reside in a substance termed "protoplasm," or "bioplasm," differentiated more or less, which bears to it about the same relation that a conductor does to the electric current; but in no way possesses life as an inherent property.

6. The great majority of all living beings are organised—that is possess organs or parts which perform functions. Do not live because they are organised, but are organised and have structure because they live. There is something in the action and nature of vital energies different from anything observed in physical: for it is not organism which gives life, but life which causes organism.

As there are six leading characteristics of life, so are there six different types of animal structure. At first sight we suppose that every kind of animal has its own peculiar plan; we do not imagine that a lobster and a butterfly are built upon the same type, yet they really are: all known animals spring from

this unity; and, in spite of their great and many outward differences, are arranged into six kingdoms.

1. PROTOZOA (πρῶτος, first ζῷον, life),

Are generally of a very minute size, composed of a nearly structureless, jelly-like substance. Animalcules, sponges, infusoria. They are not definitely segmented, have no nervous system, no digestive apparatus — beyond, occasionally, a mouth and gullet. The simplest, called monera, are small living corpuscles; nothing more than a shapeless, mobile, little lump of mucus or slime. Take a rhizopod: from the outside of this creature, which has no limiting membrane, numerous thread-like processes protrude. Originating from any point of the surface, each may contract again and disappear; or touching some fragment of nutriment, draw it, when contracting, into the general mass—thus serving as hand and mouth. This structureless body may join and become confluent with its fellow bodies; and, in brief, is at once all stomach, all skin, all mouth, all limb, and all lung.

2. CŒLENTERATA (κοῖλος, hollow; ἔντερον, intestine).

Sea anemones, corals, sea jellies, sea firs. Most of them rise considerably above the protozoa in organization. They have a body-wall composed of two principal layers, an intestinal cavity, and a mouth leading into it. They have no organs of circulation, no nervous system—or but a rudimentary one; the mouth is surrounded by tentacles arranged in a star-like manner. The common hydra is commonly taken as a type of the lowest division. It can live when the duties of skin and stomach have been interchanged by turning it inside out.

3. ANNULOIDA (*annulus*, a ring; εἶδος, form).

Sea-urchins, starfishes, land-stars, some internal parasites, as the tape-worm, with some minute aquatic creatures. The digestive canal is completely shut off from the cavity of the body; there is a distinct nervous system; a system of branched water vessels, usually communicating with the interior; the body of the adult, often "radiate," is never composed of a succession of definite rings.

4. ANNULOSA.

Animals with bodies composed of numerous segments or

rings ; and nervous system, forming a knotted cord, along the lower surface of the body. Worms, leeches, crabs, lobsters, spiders, scorpions, centipedes, insects.

5. MOLLUSCA (*mollis*, soft).

Shell-fish, snails, cuttle-fish, nautilus. Soft bodies, hard shells ; no distinct segmentation of the body ; and a nervous system of scattered masses.

6. VERTEBRATA.

Animals with a vertebral column. The body composed of definite segments, arranged longitudinally one behind the other ; the main masses of the nervous system are placed dorsally. The limbs are never more than four in number. Fishes, amphibians, birds, mammals, man.

These modern classifications, with man at their head, are very simply arranged in the Divine account of the genealogical tree. We have moving creatures in the water, and creeping things on land ; animals of length, birds, beasts, cattle, and man. Marine life, first created, is represented by the earliest fossils ; and in the order of creation—plant, fish, bird, mammal, one generation hands a lamp of higher life to the next. To mark off the groups simply as beasts, birds, fishes, creeping things, is to make their differences of appearance, modes of life, and relative importance conspicuous. Creative energy, we may be sure, did not act by breach of natural law, but with power put forth uniformly ; and in plant, fish, bird, mammal, there may have been no perceptible difference in their dawn of existence. They were not introduced collectively, or simultaneously; but at different periods in the day of life ; and the earliest possessed characters in combination such as we now-a-days find separately developed in different groups of animals.

It is pleasant to have the kinship of all things authoritatively stated : the water brought forth, and the earth brought forth ; the vegetable had seed in itself, and the animal possessed life after his kind. Not only are all living animals reducible to five or six fundamental plans of structure ; but amongst the vast series of fossil forms not one has yet been found with peculiarities entitling it to be placed in a new sub-kingdom. The animals belonging to the sub-kingdoms are

framed upon the same fundamental plan of structure, and are also arranged in a series of groups. All the shell-fish, for example, are built upon a common plan—a plan representing the ideal mollusc.

In the kinship is individuality, and in the unity diversity. Every life possesses its own life. The primordial germs are essentially different, and tend toward the vegetable, or toward the animal, by such different lines that no plant becomes animal, no coral turns star-fish, no worm grows into leech, no cockle transforms into cuttle-fish. There are organisms with vital action not more lively than that of drops of oil fusing themselves together when they meet, and they attain no higher existence: fuse millions together yet no other animal is formed.

Trace the Process of Life.

All organisms arise out of structureless living matter, which in the primal state was not living at all. The essential principles of every change, or the active and moving part, no one knows how nor whence they come, enter and reside in the matter itself; and work, for the most part, from within. The earliest stages of organisms possess the greatest number of similarities. Somewhat further on, the characters are those belonging to a smaller number of organisms. At every advance, traits are acquired which successively distinguish group from group, and are finally narrowed into the highest species of finished structure. Thus were produced many varieties or species: creatures being modified by circumstances for circumstances: heredity and adaptation being the two great agents in influencing the mystery and variety of the living world of forms. In the finished structure of most advanced life we still find the same original or rudimentary matter out of which all organisms were created, and with which all are now built. Not only so, the screws, fastening the parts; the levers, raising them to a higher state; the pulleys, drawing them together; and the joints, knitting several limbs into one body; are constructed on common patterns. This fact, proving unity in the underlying energy, is a sparkle of the great truth that rules the universe: for example, the hydrogen atoms in the sun and planets vibrating

in unison with those on our planet, are like two tuning-forks set at concert pitch; and, awaking human response, we say—"The mighty synthesis is proof that God is One."

The fact is capable of further development. Every process of initial life is the prophecy of an advanced life. From inorganic world-elements arise all organisms. A germ of life, even before it is large enough to be seen, contains in itself a special endowment—the invisible constructive potentiality of every organ. The first steps of life are in a path common to all, but quickly turn aside; and, by way of its own, every living creature arrives at a peculiar destination. In plants we have production and reproduction; in animals self-perception, self-control, and motion; in man self-consciousness, will, and moral power; the whole wrought by a deeper and more far-reaching energy than science can find any satisfactory explanation of, all the vital actions being, as the oscillations of a needle, moved by unseen influences from within and without.

The bringing forth of kind after its kind, that process by means of which new individuals are produced, and perpetuation of the species is ensured, presents many marvels. Some of the lowest and smallest animals are of both sexes,—"hermaphrodite." Others are non-sexual, and the young are produced by gemmation or fission.

Hermaphrodites are double-sexed individuals. Many plants, garden-snails, leeches, earth-worms, and various other worms, are of this order.

Gemmation (*gemma*, a bud) is the production of young by a bud or buds, usually on the outside, but sometimes on the inside of an animal. Thus new life is formed, which may either be completely separated from the parent, or remain connected with it, and form a stock or colony.

Fission (*findo*, I cleave) is the production of new beings by the cleavage or division of a primitive zoöid into two or more parts. This fission, occurring frequently, reproduces by tolerably rapid multiplication. An internal fission, or swarming, causes the death of the parent, and produces a vastly multiplied offspring.

In the Vertebrata and all high kinds of life, reproduction is

always sexual, and the sexes are in different individuals. Most are oviparous, producing eggs from which the young are developed; but the higher vertebrates bring forth their young alive.

Until recent times it was thought that in every species the successive generations were alike,—this is called homogenesis. It is now proved that in many plants, and in numerous animals, the successive generations are not alike,—this is called heterogenesis. The progeny, differing from the parents, produce others, like themselves, or like their parents, or like neither, but; eventually the original form reappears. There is no scientific explanation of this; we can only ascertain the varying order of it as seen in different creatures. In all cases of sexual or gamogenesis, there is reason to think that even among the lowest Protozoa, a fusion of two individualities is the process from which results the germ of a new series of individuals; so that in those humblest forms, which have no differentiation of sexes, the union is not of sperm-cells and germ-cells of the same individual, but union between those of different individuals. The power is mysterious, and the more so that the cells, or cradles of life, are not greatly specialized in mechanism, they rather seem unspecialized; yet, if there is no special arrangement to secure conditions of existence for different modes of multiplication, it is certain that arrangements which secure these special ends do continually establish themselves. No visible or mechanical property explains the profound distinction between the male and female reproductive elements; but in the union of these begins, at once, or on the arrival of favourable conditions, a new series of developmental changes; a process of cell-multiplication is set up, and the resulting cells aggregate into the rudiment of a new organism. The force by which two adjacent atoms attract or repel each other, their mode of exercise and law of variation, are incomprehensible. Every effort to understand the essence and origin of life leading to the Great Unknown, from whom all life has sprung, according to the patristic interpretation,—*ὃ γέγονεν ἐν αὐτῷ ζωὴ ἦν* (Jno. i. 3, 4).

We may now briefly summarise some of the principal

results to be deduced as to the succession of life on the earth. The creation of marine animals was first, and the first living creature that we know of is the Eozoön. What did Eozoön live on? Small animals with shells of carbonate of lime; otherwise, how was its vast mineral skeleton obtained? Other creatures existed even more humble than the food of the Eozoön, and it is not unworthy of consideration whether primal life did not exist when the waters were very warm. Even now the coral luxuriates in the equatorial temperature of 90° and more. There are Infusoria which flourish in warm springs, and the life cannot be got out of a germ by simple boiling. "The waters swarmed a swarm," not that the causality was in the waters, but in the creative energy or word, "Let the waters bring forth abundantly the moving creature that hath life (es sollen wimmeln die Wasser vom Gewimmel)." This life is and has been so abundant that the earliest limestones of the globe teem with the evidence of former minute life, and this is the case with every limestone down to those now forming in the abyss of the ocean. Ehrenberg discovered that in slate of close texture, 41,000 millions of these infinitesimal creatures were contained in a cubic inch. Coral animals were introduced, and since have been found efficient workers; but the deep seas of old, and the depths of modern oceans, both assert that the first workers are pre-eminent. This dawn of life was by a long, slow process; nevertheless, sponges, lingulæ, orchids, trilobites, sea-worms, with many other creatures representing five of the great sub-divisions of animals—Protozoa, Cœlenterata, Annuloida, Annulosa, Mollusca—are found in the very old rocks.

These old rocks have rain indentations, ripple-marks, and shrinkage cracks, which prove that the actions of rain, of tide, of sun, were the same then as now. "Were there no land animals to prowl along the low tidal flats in search of food? Were there no herbs nor trees to drink in the rains and flourish in the sunshine? If there were, no bone nor footprint on the shore, no drifted leaf nor branch, has yet revealed their existence to the eyes of geologists."[1] We may, however, be sure that the creative process was not stayed on the land for

[1] "The Story of the Earth and Man," p. 32: J. W. Dawson, LL.D.

full development of life in the sea, but that birds and animals lived much earlier than the earliest known fossils indicate. "It is even possible that in a warm and humid condition of the atmosphere, before it had been caused 'to rain upon the earth,' and when dense 'mists ascended from the earth and watered the whole surface of the ground,' vegetation may have attained to a profusion and grandeur unequalled in the periods whose flora is known to us."[1]

In the Upper Silurian period we find fishes, not of large size, nor abundant, of two separate types. Ganoids, represented at the present day by the Sturgeons, the Gar-pikes of North America, and a few other less familiar forms; Placoids, or shark-like fishes. These two groups are both distinct and highly organised. Ordinary bony fishes were not introduced until comparatively recent time. In the Devonian era was a vast increase, and it became preeminently the age of fishes. New lands were upheaved, with extended muddy and sandy flats around them; shoals of fishes, some very remarkable, swarmed in shallow seas and estuaries. Among the most ancient and curious, appearing also in the Upper Silurian, are the Pteraspis, a tribe of mailed fishes, akin to the Cephalaspis, or buckle-head; its broad flat head being rounded in front, and prolonged at the sides into two great spines. Another group of small fishes, represented by the Pterichthys, had two strong bony fins at the sides, which served for swimming, for defence, for creeping on and shovelling up the mud at the bottom of the sea. There were great fishes with strong cutting double-rowed teeth; wrinkle-scale, bone-scale, and star-scale; and the huge Dinicthys, having head more than three feet long and eighteen inches broad, two long sabre-shaped tusks, each a foot long, and a body about thirty feet in length. The Carboniferous fish were numerous, great Ganoids, with sharp bony scales and sharp-edged or conical teeth, haunted the creeks and ponds of the coral swamps. Multitudes of sharks with sharp-edged trenchant teeth; and one species allied to the existing Port Jackson sharks—their mouths paved with flat teeth for crushing shells; sought prey near shell banks and coral reefs. The

[1] "The Story of the Earth and Man," p. 32: J. W. Dawson, LL.D.

broad-snouted, plate-covered, and mud-burrowing crustaceans, the Trilobites, are lost in this period. In the Cretaceous period are found the first examples of the great group of Bony Fishes, or Teleosteans, comprising the great majority of forms now existing. The main forms of fishes characterising the Eocene are like those which predominate in existing seas. Those of the Miocene were abundant, and some of the species attained gigantic dimensions.

The amphibious part of creation are the link which joins land animals and fish. There are fish which have the habit of leaving the water for a forage on land. Let their fins be lengthened and moderately altered in shape, the tail modified, and we shall have some of our amphibious animals almost to the life, of which are many high groups in the Carboniferous deposits. There were little reptiles of the coal forests. The most fish-like were the Archegosaurus, with large heads, short necks, permanent gills, feeble limbs, and strong tails for swimming. They were of higher order than fish, in possessing lungs and feet. The first undoubted remains of true reptiles are found in the Permian deposits. From these creatures are two lines of ascent—one leading to gigantic crocodile-like animals; the other to small delicate lizard-like species, dwelling on land and feeding on insects. "Imagine a little animal, six or seven inches long, with small short head, not so flat as those of most lizards, but with a raised forehead, giving it an aspect of some intelligence. Its general form is that of a lizard, but with the hind feet somewhat large, to aid it in leaping and standing erect, and long flexible toes. Its belly is covered with long scales, its sides with bright and probably coloured scale armour of horny consistency, and its neck and back adorned with horny crests, tubercules, and pendants. It runs, leaps, and glides through the herbage of the coal forests, its eye glancing and its bright scales shining in the sun."[1] This is a picture of the as yet earliest known lizard, the Hylonomus, the oldest animal which has a fair claim to be called reptile. In the Permian rocks are highly organised lizards with socketed teeth, well-developed limbs, long tails, and biconcave vertebra. They connect the Carboniferous

1 "The Story of the Earth and Man." J. W. Dawson, LL.D.

with the new and great reptiles of the Mesozoic age. This age was their special time. Some were gigantic, others small; there were browsers on plants, and terrible renders of living flesh; some had a resemblance or prophecy of birds, and not a few pre-figured future mammals. There were the Iguanodon, or his relative Hadrosaurus, with small head and teeth for munching leaves and fruit of trees; and the terrible Megalosaurus, a vast lizard, with some bird-like foreshadowings. The short deep jaws and heads of some others made them like the carnivorous mammals of later times. The Cetiosaurus, huge monster, was not less than ten feet in height and fifty in length. There were sea-serpents with heads eight feet long, and conical teeth a foot in length; but, perhaps, no creatures set before us so fully the stretched-out reptiles of the fifth day creation, as the Mosasaurus and Elasmosaurus in their enormous length and terrible powers of assertion in the world.

Animals of the water are cold, stiff, mute, in contrast with birds, which are warm, free, and full of melody; yet they are spoken of as created on the same day; and accurate knowledge finds that they are closely allied. The advance to birds was through the lizard: "God created every living creature that moveth, which the waters brought forth abundantly, after their kind, and every winged fowl after his kind." The contrast is between the water and the air; fish in the one, birds flying in the other.

Birds are subdivided into: Struthious, such as the ostrich, cassowary, emeu, dinornis, etc.; Carinate, including all other forms. These have a striking resemblance to Pterodactyles; the former appear to have for ancestors large reptilian forms akin to the Dinosauria.

The way in which the interval between fish and fowl is spanned, may not be apparent to the unlearned in such mysteries; but to the student, who has studied their inner structure, no insurmountable difficulty presents itself. Let any one notice that the form of the fish glides easily into that of the lizard, then let him compare the lizard with the bird. The long snout of the crocodile is not unlike the beak of a bird. The Plesiosaurus is not very unlike a swan, and yet it is in reality a gigantic Eft. Raise the crocodile on his hind legs, extract the

claws from the fore feet, by lengthening the bones you have wings, and the whole forms a bird—a veritable flying dragon. Almost startling is the ease with which, by modifying or developing certain parts, a lizard may be turned into a bird. Hence that which puzzled one in childhood, becomes clear when we inquire into the reason of things. We behold the transformation in those reptile-bats, Pterodactyles, of the Mesozoic ages, which were lizards of a high order. One species had twenty feet of expanse in its wings, the skulls show a good capacity of brain, the skeletons were light yet strong, the hollow bones having pores for the introduction of air. "Imagine such a creature, a flying dragon, with vast skinny wings, its body perhaps covered with scales, both wings and feet armed with strong claws, and withlong jaws furnished with sharp teeth. Nothing can be conceived more strange and frightful. Some of them had the hind legs long, like wading birds. Some had short legs, adapted perhaps for perching. They could probably fold up their wings and walk on all fours."[1] In this old world time, lizards had wings; and birds had tails and hands like lizards. In the same Mesozoic ages, birds existed resembling those of our own day; and almost at the same time some weak small mammals, forerunners of those higher types which were to possess the world. Most probably the earliest birds were sea-fowls: soon were waders, equal in size to the ostrich, stalking through the shallows; while tortoises, larger than the rhinoceros, crawled over the mud. The following is the latest scientific classification of Birds:—

1.	Natatores	Swimmers.
2.	Grallatores	Waders.
3.	Cursores	Runners.
4.	Rasores	Scratchers.
5.	Scansores	Climbers.
6.	Insissores	Perchers.
7.	Raptores	Snatchers, Catchers, Birds of Prey.
8.	Saururæ	Lizard-tailed Birds.

A natural and laudable curiosity leads to the enquiry—what did the wisest of the ancients think concerning the

1 "The Story of the Earth and Man." J. W. Dawson, LL.D.

world's origin? A brief summary of the Bible statement may well be compared with one by a man whose genius is of universal renown.

The Bible Statement—(1) The origin and existence of many worlds were from the beginning. (2) Light was called into existence to be, what it is now known to be, the great conditioner of all things. (3) There was a separation by which mingled elements acquired what may be called individuality; for, at first, as Plato says—"all things were without reason and measure, . . . this, I say, being their nature, God fashioned them by form and number, . . . and out of them He constructed the universe:"[1] the elements being grouped in gases, liquids, solids; or, as Scripture calls them, air, water, earth. (4) In the water, on the land, and in the air, manifold forms of life appeared; first in the water, thence extending to the land, afterwards rising into the air, until the world was replenished.

Now, take from Plato, who represents Socrates, the following statements—"God desired that all things should be good and nothing bad as far as this could be accomplished. Wherefore also finding the whole sphere not at rest, but moving in an irregular and disorderly manner, out of disorder He brought order, considering that this was far better than the other.[2] . . . Now the creation took up each of the four elements; for the Creator compounded the world out of all the fire, and all the water, and all the air, and all the earth, leaving no part of any of them nor any power of them outside.[3] . . . The Creator of the universe spoke as follows:—Gods and sons of Gods, who are my works, and of whom I am the Artificer and Father, my creations are indissoluble, if so I will. . . . Three tribes of mortal beings remain to be created, —without them the universe will be incomplete, for it will not have in it every kind of animal which a perfect world ought to have. On the other hand, if they were created and received life from Me, they would be on an equality with the gods. In order then that there may be mortals, and that this universe

[1] "Timæus," translation by Dr Jowett.
[2] "Timæus," p. 525, sec. 30.
[3] "Timæus," p. 527, sec. 32.

may be truly universal, do ye, according to your natures, betake yourselves to the formation of animals, imitating the power which I showed in creating you.[1] . . . They, imitating Him, received from Him the immortal principle of the soul; and around this they fashioned a mortal body, and made the whole body to be a vehicle of the soul, and constructed within a soul of another nature which was mortal, subject to terrible and irresistible affections.[2] . . . A brief mention may be made of the generation of other animals, but there is no need to dwell upon them at length. . . Of the men who came into the world, those who are cowards or have led unjust lives, may be fairly supposed to change into the nature of women in the second generation. . . . Thus were created women and the female sex in general. But the race of birds was created out of innocent, light-minded men, who, although their thoughts were directed towards heaven, imagined, in their simplicity, that the clearest demonstration of the things above was to be obtained by sight; these were turned into birds, and they grew feathers instead of hair. The race of wild pedestrian animals again came from those who had no philosophy in all their thoughts, and never considered at all about the nature of the heavens. In consequence of these habits of theirs they had their forelegs and heads trailing upon the earth to which they were akin; and they had also the crown of their heads oblong, and in all sorts of curious shapes, in which the courses of the soul were compressed by reason of disuse. And this was the reason why quadrupeds and polypods were created. . . . And the most foolish of them who trailed their bodies entirely upon the ground and have no longer any need of feet, He made without feet to crawl upon the earth. The fourth class were the inhabitants of the water: these were made out of the most entirely ignorant and senseless of beings, whom the transformers did not think any longer worthy of pure respiration, because they possessed a soul which was made impure by all sorts of transgression, . . . hence arose the race of fishes and oysters, and other aquatic animals, which have

[1] "Timæus," pp. 534, 535, sec. 42.
[2] "Timæus," p. 563, sec. 70.

received the most remote habitations as a punishment of their extreme ignorance."[1]

We have not taken that which Dr Jowett rightly calls "obscure and repulsive," but the simplest and best. If any man can find in Plato or Aristotle, amongst Greeks or Romans, in old Egyptian or Sanscrit literature, any account of creation worthy to be compared with the Scriptural narrative; brief, yet comprehensive; accurate, yet general; simple, yet growing in meaning and power with the development of science; there may be a show of argument that Moses was wholly taught of other men: but, until that is done, Christians rightly maintain that Moses wrote the Sacred Narrative of creation by Inspiration of God. In any case, a true science existed, which could not have been acquired by any of the modern accurate experimental processes; the existence of this science renders possible the knowledge of many other things, the source of which we cannot trace.

Faith not merely begins where science ends, but must accompany science every day in the conduct of life. The death-watch may say of the clock he lives in, "Tick, tick, tick, it is all tick: that is its final cause and purpose;" but we are not content with beetle philosophy; nor do we count the screws, levers, and pulleys of the world, equivalents of existence. There is a "line between that which is physical and that which is utterly beyond physics. . . . Man has been left to the resources of his intellect for the discovery not merely of physical laws, but of how far he is capable of comprehending them. . . . A revelation of anything which we can discover for ourselves, by studying the ordinary course of nature, would be an absurdity."[2] Truly so, but a revelation of that which, otherwise, would remain for ever unknown, is a benefit indeed; and when we find that the philosophical systems of Germany, apart from Scripture, though wonderful efforts of human reason, have not added one tittle to our positive religious knowledge; no, not even by saying, "There is a God;" we thank God for the Bible.

Men who purpose henceforth to do without God tell us—

[1] "Timæus," pp. 584, 585, sec. 90, 91, 92, Jowett's translation.
[2] "Recent Advances in Physical Science," p. 25: P. G. Tait, M.A.

"Those who can read the signs of the times read in them that the kingdom of man is at hand."[1] An ancient king, like-minded, said—"I saw a tree in the midst of the earth . . . the tree grew, and was strong, the height thereof reached unto heaven, and the sight thereof to the end of all the earth: the leaves thereof were fair, and the fruit thereof much, and in it was meat for all: the beasts of the field had shadow under it, and the fowls of the heaven dwelt in the boughs thereof, and all flesh was fed of it." The Tree was a symbol of the king. He thought, like some modern men, that a human throne, a kingdom of man, would be established; and said to himself—"My greatness is grown, it reacheth unto heaven, and my dominion to the end of the earth." What happened? A holy one came down from heaven, and cried aloud—"Hew down the tree, and cut off his branches; shake off his leaves, and scatter his fruit; let the beasts get away from under it, and the fowls from his branches." What is the interpretation? At the end of twelve months that king lost his reason, went from among men, and dwelt with the beasts of the field, till his hair grew like eagles' feathers, and his nails like birds' claws, (Dan. v. 10-34). The mystery has further interpretation: when men, to fill up the chasm between civilized and savage man, cast in their religion; and, endeavouring to bridge the abyss separating savage from brute, sink human emotion and intellect to the appetite and instinct—their language and conduct to the howling and herding of beasts; then the holy watcher comes among them with the decree of heaven that their intellectual power, the greeting of the spirit, shall depart from them; and that they shall be as the beast of the field, until they know that the Most High ruleth in the kingdom of men.

There is, indeed, a true kingdom of man coming, long foreseen, long prepared for, with dominion and glory, the union of all nations under one everlasting sway (Dan. vii. 13, 14). We have evidence of it in the spirit which knits our mind and body into personal identity; in the spirit running, like a thread of continuity, through all our chequered life, and the song of the herald angels—"Glory to God in the highest, and

[1] Professor W. K. Clifford, *Nineteenth Century*, October 1877.

on earth peace, good will toward men," not only translates the prophet's vision into the common faith of our Christianity, but gives it the foundation of objective reality, by means of a glorious host and celestial song. We are not hindered in our faith by those who say—"Does the song of the herald angels . . . express the exaltation and yearning of a human soul, or does it describe an optical and acoustical fact—a visible host and audible song? If the former, the exaltation and the yearning are man's imperishable possession—a ferment long confined to individuals, but which may by and by become the leaven of the earth. If the latter, then belief in the entire transaction is wrecked by non-fulfilment. Look at the East at the present moment as a comment on the promise of peace on earth and good will toward men."[1] The objector does not see that the binding up and embalming of all the struggles and searchings of human life, so that

> "Our deeds still travel with us from afar,
> And what we have been makes us what we are,"

afford as marvellous and mysterious an indication of life above and beyond that of fishes, reptiles, and birds, as do the angel host and heavenly song of yet higher and yearned for life in real objective existence. If the exaltation and the yearning are indeed man's imperishable possession, are actions arising out of our inner core, and real as the life arising from grouping of particles in creatures of water, earth, and sky? then, why doubt concerning those revelations which yield glimpses of that splendid existence, and that peaceful state, which will be a renewal of the earth and an establishment of a Divinely Human dominion?

> "There are buds that fold within them,
> Closed and covered from our sight,
> Many a richly tinted petal,
> Never looked on by the light;
> Fain to see their shrouded faces,
> Sun and dew are long at strife,
> Till at length the sweet buds open—
> Such a bud is life.
>
> . . . . . .
>
> What it shows and what it teaches
> Are not things wherewith to part." JEAN INGELOW.

[1] Professor Tyndall, Address as President of the Midland Institute, Birmingham. Reported in *The Times*, 2d October 1877.

STUDY XIV.

DAY VI.—CREEPING THING, BEAST, CATTLE.

"A little philosophy inclineth men's minds to atheism ; but depth in philosophy bringeth men's minds about to religion."—LORD BACON.

"Revelation is no theory. Its truth or certainty, as a fact, can only be estimated historically in the same way as other matters of fact."—*Introduction to the Science of Religion* : Professor MAX MÜLLER.

WE are required by opponents of Scripture to reconcile the erroneous interpretations of friends and the assertions of enemies with the sacred text ; to justify unscientific theories of instantaneous creation, and to prove that everything was done without use of means, or of natural laws. We reply—the Divine account reveals an orderly plan and continuous operation : no reasonable person, unless prepossessed by a theory, after carefully reading the first chapter of Genesis, with the light of modern science, can think that elemental atoms were brought into existence by mere command ; and, so soon as commanded, flashed into living tissues. No well-informed believer imagines that every plant and animal was separately formed, as by hand-fashioning, out of the dust ; or out of nothing, as by magical power.

When Mr Herbert Spencer[1] states—"No one ever saw a special creation : no one ever found proof of an indirect kind, that a special creation had taken place"—he ought to know that creation need not be instantaneous, but may be effected by natural processes, as are modifications of the created by influences from within and without. As to seeing a creation, whoever saw an evolution ? Embryology, and the passage of invisible through the visible into the invisible, are as much symbols and illustrations

[1] "Principles of Biology," vol. i. p. 336.

of creation as they are of evolution. No one can solve the ultimate mystery of the universe. If the evolutionist thinks that he has settled it by declaring—"the egg was before the bird, not the bird before the egg;" Christians answer—However many and separate acts, different in degree and kind, may or may not, precede the flash of life, the old truth remains firm as ever—"Out of the ground made the Lord God to grow every plant; and out of the ground the Lord God formed every beast of the field."

Let those who would remove the footsteps of the Eternal from Palestine, and Providence from Jewry; make the saints orphans, and deprive man of sonship to God; tell us how matter, if created, was created—unless by Deity; and, if not created, how the eternity of its existence is more comprehensible, than the Christian's belief, that matter, and all other phenomena, are manifestations of the Great Unknown. If the many thousand impulses of energy do not proceed from Hidden Energy, into what abyss will they be our guides?

Mr Herbert Spencer asks[1]—"Why should not omnipotence have been proved by the supernatural production of plants and animals everywhere throughout the world from hour to hour?" It is proved: though he asks so unwise a question, the inquirer knows very well that plants and animals are produced everywhere throughout the world from hour to hour by omnipotence; he has stated again and again—"all phenomena are manifestations of the Unknown." Suppose the proof came otherwise, or by quicker process, that men did see, day by day, light flash out of darkness, the living rise up out of the dead, and things wholly unlike grow from utterly unlikely things; so that every kindled fire, every dawn of day, every oak from the acorn, every man from a scarcely visible ovule, appealed to them; would they believe? Would they not exclaim that man was a sudden evolution, that the oak grew naturally very quickly, that fire was the result or act of combustion, and that the sun rose according to mechanical law? If so, what proof could be given that wilful men would not misinterpret? Could we devise any procedure that might not be explained away? If full-grown men fell from the

[1] "Principles of Biology," vol. i. p. 339.

clouds, is it not likely that a theory—as of aeorolites, would render their fall a natural event? Is the life of every individual now, and the present continuance of species; the growth of every harvest, and production from hour to hour of plants by natural succession; less wonderful than was the beginning of these things? Does the accounting that everything is self-produced; or, which is the same, produced by nature's own power; explain the difficulty? Why, it is to put the Spirit of Divinity into stocks and stones; to make men like those Fetich-worshippers, who adored the spirit of steam in the engine, and prayed to the cranks and joints! There is an inquiry, on the page already referred to—"To what purpose were the millions of these demonstrations which took place on the earth when there were no intelligent beings to contemplate them? Did the unknowable thus demonstrate His power to Himself?" Surely, philosophers do not imagine that there are no beings unlike themselves; nor fondly dream that beings like themselves are the greatest things in heaven and in earth? that there is no God beside them? that Nature and God, Space and Matter, Time and Energy, are superfluous; unless men look on and admire?

Creation does not, necessarily, imply an abrupt appearance; but, simply, a Divine work. Any and every type of life may have begun with imperfect form, and have attained the highest state after many ages of existence. We know that organic form, whether of vegetable or animal, continues the same only so long as the inward conditions and the outward circumstances remain unchanged; it was so in the past, it will be so in the future; anything otherwise would be impossible. If it were not, the jest and mad freak of Mephistopheles would be true—

> "Wine grapes of the vine are born,
> Front of he-goat sprouts with horn,
> Wine is juice, and wine-stocks wood,
> Wooden boards yield wine as good!
> There is truth for him that sees
> Into nature's mysteries."—*Faust.*

It is not enough for the auditory and optical nerves to have a sensation, the intellect must reflect. The material ear and

eye give work for the spiritual ear and eye. Everything visible conducts to the invisible. Not only so, it is impossible for any man to know all sciences, he cannot know one, cannot know one thing perfectly in any one science; every science, and everything in every science, speedily passes beyond knowledge, and is lost in the unknown. It is gross presumption to bring up from the depths of this ignorance the assertion—"all life motion and intelligence in the world are mechanical—as Vancanson's duck which eat and digested its food; or as the flute player of the same artist." Why those mechanisms were the work of mind, and maintained by mind. Even so, the beautiful arrangements of nature, in their uniformity and variety, in that which we understand and in that whereof we are ignorant, bring us to the acknowledgment of mind. The modes of action according to natural law cannot be arranged in scientific form, until they are represented to our mind as the work of intelligence. We naturally seek for, and are not satisfied till we find, tokens of intelligence, like, but infinitely greater than our own, in the moving power. If our argument is badly worked—

> "Though you see a churchman ill,
> In the church continue still."

To obtain a conception as to order and will in creation; try, by scientific imagination, to get a view of their reality in a triple truth concerning Vitality: 1. Unity of Power, 2. of Form, 3. of Substance.

1. Unity of Power.

All the activities of vitality are for maintenance of the body, for changes in its positions and parts, and for continuance of the species. If we add activities of consciousness, intellect, and volition, the scheme embraces the highest forms of life, and covers those of the lowest creatures. The activities are propagated and maintained by a rhythm of motion. Looking through a telescope of high power, we find that every pulsation of the heart gives a rhythmical jar or undulation to the whole room. Light also consists of undulations; the rays of heat, the movements of electricity, and the motions of projectiles are rhythmical. The rhythm is compound; there are solar, planetary, and terrestrial rhythms;

but they appear most numerously in the phenomena of life. There are rhythms in muscular action, in blood circulation, in contraction and expansion of the lungs, in the periodic need of food and repose, in the increase and decrease of life, and in the successive changes of organic forms. Indeed the whole of that mysterious thing, whatever it may be, the life of plants and animals, is, so far as it is physical, entirely an exhibition of rhythmical transformations of energy. The rhythm of poetry and music are the outcome of rhythm in sensation, intelligence, and emotion. This energy, so far as our earth and our physical life are concerned, centres in the sun; and from the sun, mechanically and chemically, come that aptitude and power by which atoms of salt crystallise, and amorphous fragments arrange and rearrange themselves into special structures. Atoms of albumen, fibrine, gelatine, or the hypothetical protein-substance, do not, of themselves, take specific shapes; their doing so is a manifestation of this peculiar energy.

2. Unity of Form.

If a drop of human blood be taken, kept warm, and examined under high microscopic power, there will be seen structureless corpuscles in marvellous activity, capable of individual movement and change of form—these are minute portions of undifferentiated protoplasm. They are not of the same shape or size in the human organism, as in beast and fowl, in reptile and fish, in worm and plant, but there is a general likeness in the peculiarity: "Traced back to its earliest state or form, the nettle arises as man does, in a particle of colourless protoplasm."[1] So arising, life diverges into the different vital activities, balancing of functions, changes of condition, growth, adaptation, individuality, morphological, and physiological development. Not by the development of individuality from the germ, as if the germ contained the perfect organism in miniature; but by that persistence of rhythmical force acting upon their living particles, and developing their intrinsic aptitude, or polarity, into the plant or animal by what may be called special endowment. How strong the action is may be exemplified by the Bigonia.

[1] "Physical Basis of Life." Prof. Huxley.

A fragment of the leaf, small as a hundredth-part of the whole, placed in fit soil, and kept at suitable temperature, will become a complete plant. Other plants have like power; and a common polype may be cut into very small pieces; yet from every piece will grow a perfect animal.

This process in development of form is subject to continual change, but within definite limits; for, as no natural process works any, even the slightest, difference in the properties of any molecule; this unchangeableness of the molecule tends to bring about that balancing of function which causes a return from variabilities to the original form or stock. Every living body, therefore, having diverged from the normal course; will, so soon as the accidental causes of deviation have expended their force, by that power which physicians call "vis mediatrix naturæ," return to equilibrium. Every variation has its limit, the increase and decrease of species, their range and degree of perfection in likeness and unlikeness are not by metamorphoses of confusion, but by a world-wide process giving unity of form.

The process may be partially explained—"The first centre of sarcode, or indifferenced organic matter, however originated, yet with certain definite tendencies to formal character and course of growth (as in a Foraminifer, *e.g.*), buds forth a second centre of identical nature; this a third, and so on. . . such repetitions of a primal complexly organized whole. . . are suggestive of operance akin to that of inorganic polar growths, as in a group of crystals, wherein each exemplifies the characters of the mineral or crystalline species, but is subject, like vital growths, to occasional malformation. . . Growth by repetition of parts rapidly gives place to the higher mode of development by their differentiation and correlation for definite acts and complex functions.[1] Hence, all organic matter has certain definite tendencies to formal character and development, which seem to be the impress of eternal fundamental energy. The endowment is there, whatever it may be; and, because of this endowment, there proceed from primordial germs, in no respect distinguishable, the whole variety of life. This startling fact disposes of the

[1] "Anatomy of Vertebrates," pref. p. ix. 10. Richard Owen, F.R.S.

crystallization doctrine of evolution, by taking the essential and distinctive facts of life far beyond the region that any theory is able at present to approach. We conclude, therefore, that the popular statement of Scripture covers accurate scientific reality: from primary "indifferenced" organic matter, proceeded undulations or rhythms, which progressing along straight or in circular lines culminated in life. Every organism being a complex system of forces, and the higher organisms an almost infinite complication as compared with our powers of analysis.

3. Unity of Substance.

All the forms of protoplasm which have hitherto been examined contain, when dead, the four elements: carbon, hydrogen, oxygen, nitrogen, and some sulphur. The flower of the field, and the blood which courses through our veins, the dense resisting mass of oak, and that transparent jelly which pulsates in the waters of a calm sea, are bound by one common tie, and are akin: "In wisdom God made them all" (Ps. civ. 24). The significance of this cannot be exaggerated; the occult subtle influences, making an essential distinction and difference where man finds none, are wonderful! When we think that the microscopic fungus, and the great Finner whale; all that wealth of foliage lying between the lowest plant, and those trees which endure while nations and empires rise and fall; that Shakespeare, the genius, and midges evoked by the sun; are all knit together by unity of substance, and have community of faculty through one Divinely-fashioned material; we stand in awe of that varied interaction which makes nature beautiful as a robe of the Almighty.

Life-energy inspires this unity of substance, of form, of power, with variety in mechanical, chemical, and vital operation; plying the tongue with exquisite movements to modulate the voice; using the nerves and muscles to send forth volitions; and, by the intellect, conversing with those invisible things of which the world is full. Life, moreover, continually calls our moral sense and our intellect to new functions; and, by use of memory, as to the past, carries hope forward to the future; rendering by-gone stages of existence platforms for that which is to come; so that we trace benign skill, and rejoice in

words spoken long ago—"My substance was not hid from Thee; it was made in secret, and curiously wrought in the lowest parts of the earth. Thine eyes did see my substance, yet being imperfect; and in Thy book all my members were written, which in continuance were fashioned, when as yet there was none of them" (Ps. cxxxix. 15, 16).

"Let the earth bring forth creeping thing."

Insects were in the Devonian forests. Relatives, or ancestors of our modern May-flies flitted with broad-veined wings, and their larvæ dwelt in the stagnant waters. One marvellous May-fly had netted wings, attaining an expanse of seven inches. A kind of grass-hopper, with a cricket-like chirp, raised the first insect music known. Cockroaches are of an old family, being found in the carboniferous age, with insects belonging to three of the orders into which modern insects are arranged. Shad-flies, weevils, millipedes, scorpions, and spiders, are also of the carboniferous age. The compound facetted eyes of insects were as perfectly developed then as now. Of the two oldest land-snails—one is elongated, the other rounded. In this age, or earlier, they emerged from the waters, moved on the land, and breathed air. The oldest known fossil butterfly seems to have relationship with some of the living butterflies of tropical America. In the neozoic ages appear nearly all the orders of insects. They are of later origin, as Scripture declares, than the moving things of the waters. There is a scientific hypothesis that their progenitors were crabs.

In the origin, division, and development of life, there appears to have been this order of progress:—Plants reduced special elements, existing in gaseous combination, to a solid form. Animals, deriving their forces directly or indirectly from plants, carried the transformation a step further. All the structural and functional motions of every organism being an advance from the motions of simple molecules, to those of compound molecules, and from these to those of masses. The advance may be illustrated: all sea-snails are united by well-nigh numberless intermediate forms, and seem to have been the progenitors of fresh water and land snails.

The celebrated and various snails of the Stuben Valley, near Steinheim, in Würtemburg, whose snow-white shells constituted more than half the mass of the tertiary limestone hills, exceed twenty different species; but the extreme forms are linked by so many which are intermediate, lying regularly above and beside one another, that their pedigree is easily traced.

The historical succession is generally indicated: (1.) in the palæontological history of organisms as furnished by fossils in their adaptation to those various changes in the earth, of which increase or decrease of temperature was the master fact, affecting climate, food, land, and sea level; (2.) in the history of individual organisms; (3.) in the comparative anatomy of kindred organisms. These are the three main facts which prove that a marvellous process of adaptation has been in operation from the very beginning. For example, the Nummulites, whose shells, the size of a lentil, form whole mountains on the shores of the Mediterranean, possess a house with many little chambers artistically ordered. The Polythalamia have shell-chambers wound round one another in a spiral line. The Acyttaria possess a solid shell in great variety of exquisite forms. These little palaces of beauty, regular structure, and elegant execution, are the product of a slimy formless living mass; and various, as their products, are the builders themselves. The differences, imperceptible in their chemical composition and physical construction, are brought plainly into view by the variety of their constructed habitations.

As the chasm between creeping thing of the land and swarming thing of the sea is bridged by intermediate forms; so, between fish and animal of the land, come those amphibia of which ancient days afforded gigantic examples. Are we then to conclude that the land was colonised from the water? We may smile at those who assert that every foot comes from a fin, and that fish by gaping developed lungs; but as twice a day, in the rise and fall of the tide, some plants and animals have a twofold kind of life; those only touched by the highest tides, and those never uncovered but at lowest ebb, having intervals varying both in frequency and duration; it is easy

to think of an advance of life from the sea to possess and replenish the land. Heredity from the water might be so acted upon through adaptation by land, that at last animals could wholly forsake the one for the other. The mud-fish is an example of transition into amphibia, and the tailed forms of amphibia are the most ancient. Tritons are amphibious animals, akin to frogs; and, like them, possess, in an early stage, gills, by means of which they live and breathe the air that is dissolved in the water. At a later stage, like frogs, they leave the water, lose their gills, and are able to breathe with their lungs; but if, by being shut up in a tank, they cannot leave the water, they retain their gills. The gilled salamander, axlotel (siredon pisciformis), generally remains all its life in the water; but at the Zoological Garden, in Paris, not long ago, a small number crept out of the water, from the many hundreds of their fellows, on the dry-land, lost their gills, and became gill-less salamanders—breathing only through their lungs.

Thus subjection to circumstances causes structural changes in the properties of already formed parts; but, within any assigned time, these changes fall within narrow limits; and so soon as the normal state is re-established the organ and organism fall back to their original state. Structure, handed down by heredity, is indeed liable to variations of considerable magnitude; in part by the individual, and in part by involved influences producing functional adaptations; but only power from without, acting within, can produce what is not inherent in the organism; and in no other way can we find a satisfactory explanation for the continual introduction throughout all geological time of new forms of life, which do not appear to have been preceded by pre-existent allied types. There exists some other deeper and far more reaching law than evolution. As to artificial acquirements, plants and animals when neglected relapse to their original wild forms; and mutilations of the body—though continued from generation to generation, as nose and ear piercings, misshapings of the foot—as among the Chinese, and circumcision—as by the Jews, are not transmitted. However much the lower forms of life mingle; and the outward

grades of fish and amphibia, marsupial and mammal, approach one another; distinct provinces of marine and terrestrial life are always maintained.

The Marsupial form, so akin to the reptile, preceded the other Mammalia in time. Of the Mesozoic species all are marsupial, small, and of low grade; but not lower than some now existing. Their low position may be associated with the habit of limiting the exercise of active-life faculties to the period of night's obscurity. The mother nurses her young in a tegumentary pouch, where they remain suspended to the teats, and are safely carried for a period answering to that of uterine life in the higher mammals. Where great want of water exists; and, in dry seasons, rivers are converted into pools few and far between; in such a climate and at such a time, an ordinary non-marsupial animal, like the wild cat or fox, having deposited her young, would travel perhaps one or two hundred miles to quench her thirst. "Before she could return her blind and helpless litter would have perished. By the marsupial modification the mother is enabled to carry her offspring with her in the long migrations necessitated by the scarcity of water.[1]" Mr. Owen adds, "These correlated modifications of maternal and fœtal structures, designed with special reference to the peculiar conditions of both mother and offspring, afford, as it seems to me, irrefragable evidence of creative foresight." A difficulty attends this theory: the male has a pouch, and those which live in trees and near water.

The great class of Mammals had a small beginning, and made little or no advance during the vast Mesozoic time. In the Tertiary or Mesozoic time existed that higher group which now has pre-eminence: animals related to the tapirs, bears and racoons are among the oldest. The Miocene was the culminating age of Mammalia; they were then largest and most numerous. The Deinothere was as much larger than our elephant as the elephant exceeds an ox; the skull, including snout, five or six feet long; two large tusks grew out of the end of the lower jaw and pointed downwards. The

1 "Classification and Geographical Distribution of the Mammalia:" Richard Owen, F.R.S.

most ancient beasts of prey are the feline, then the canidæ, and latest the ursidæ. Relics of their predecessors we do not possess. The beast of the earth and cattle are the freely roving vegetable and flesh-eating wild animals of the land, creatures of the marsh, the field, the forest, and the plain. The Eocene and Miocene strata of North America are crowded with carnivora, ruminantia, pachydermata, rodentia, and non-ruminating creatures of the horse, rhinoceros and pig tribes.

Heredity, or inheritance of the parents' nature, seems to be the natural cause of stability; and Adaptation the cause of modification or change in organisms. Structure and function being exposed to countless actions and reactions, from generation to generation, of ever varying circumstances, the wonder is that we have not greater varieties, and that they are not mingled in utter confusion. There must be some deep and far-reaching law marvellously adjusting stability and instability, multiplication and extinction, that due equilibrium may be preserved. In every species, animal or vegetable, the individuals are never quite alike; and in every species, even in every individual, there is a tendency to differences great enough to produce varieties. Some unknown energy sets bounds to these changes; and we are amazed that the simple egg-cell of the maternal organism, and a single paternal sperm-thread, transfer to the young the minutest bodily and mental peculiarities of both parents. The germ from which most mammals are produced is the 120th part of an inch in diameter, the same size as in man.

Doubtless, we may say of life—*vires acquirit eundo.* The original forms of it, whether few or many, were capable of development, and received it. Every new natural principle was to the preceding as a miracle, the animal a miracle to the vegetable, and man a miracle to the beast of the field. Life did not flow in an organic circle; some forms, for reasons unknown, being retarded; and other forms, ascending in many lines of development, brought in new things. Every species seems to come into being at a certain definite time, and to disappear at another definite time, though there are few, if indeed any instances, in which we can safely fix the time for entrance or exit. This bringing in or creating of new things,

is our general notion of a miracle; and foretelling new things is our general idea of prophecy. All past variety of growth and development of power were figures of future advance, or allegory of forms to come; every low grade reappearing in the higher, as initial, subservient and supporting substance. On natural life is grafted intellectual life; on intellectual life, the spiritual and moral life; on spiritual and moral life, future life. Life, ascending in many various paths, is everywhere subjected to spirit; and life subjects and connects matter, as the crystallographer connects imponderable forces and polarity; the coarse or outside substance becoming, so to speak, the precipitate of inner and finer formations. There are worlds within worlds; infinity contains space, space comprehends matter, matter embraces life, life enfolds intelligence, intelligence is the breath of spirit.

Life-forms are classed according to the differences in structure. Heredity tends to conservation; and power of Adaptation, by circumstances to circumstances, tends to variety. Hence, offspring resemble their parents; but are never wholly alike either in form or in structure. The likeness preserves the identity of species, unlikeness tends to variety. Sometimes the variety arises in full force, per saltum; but in every case there are determining causes, external or internal, or both. Even a variety which approaches the nature of a monstrosity strives to reproduce itself; much more those which are better fitted to maintain the struggle for existence. Natural causes, agents of Divine or Unknown Energy, acting through long ages of time, brought into existence from pre-existing life-forms all the varieties of life now on our globe; there is the constant introduction, throughout geological time, of new forms of life which do not appear to have been preceded by pre-existent allied types;[1] the weaker, perishing; those excelling in strength, skill, agility, and best fitted to surrounding conditions, surviving. As a rule, the animals of lowest and simplest organisation have the longest range of time; the additional possession of minute dimensions is also in favour of their continuance.

[1] For examples, see H. Alleyne Nicholson's "Life History of the Earth," p. 373.

Large and highly organised animals, though long lived as individuals, rarely live long specifically.

The formation, according to law, of varieties and species from the common type of animal structure is called "the Natural Origin of Species." The dying of unfavourable and the continuance of favourable specimens are designated "Natural Selection." So far, every breeder of sheep and pigeon fancier agrees with the philosopher. The argument may be carried into the domain of plants and flowers. Stem-leaves become sepals and petals; sepals and petals grow into stamens, nectaries, and ovaries; until the doctrine of the metamorphosis of plants stands complete. Of the forces evoked we know nothing; nor can we account for their supposed action in the constant introduction of new life-forms becoming more and more like those now in existence. As to those which are strictly species—"Each of them always remains separated from the others by an interval which nature cannot overstep."[1] "It is one of the clearest facts in the animal as in the vegetable world; all races gradually reproduce and perpetuate themselves without mingling or confounding one with the other."[2] It is put yet more forcibly—"No race will amalgamate with another: they die out, or seem slowly to be becoming extinct."[3] Professor Huxley states—"To sum up our knowledge of the ethnological past of man; so far as the light is bright, it shows him substantially the same as now, and when it grows dim, it permits us to see no sign that he was other than he is now."[4] In the same address he says—"Admit that Negroes and Australians, Negritoes and Mongols are distinct species, a distinct genera, if you will, and you may yet, with perfect consistency, be the strictest of monogenists, and even believe in Adam and Eve as the primæval parents of all mankind." So we may say with Sir Charles Lyall—"There is no valid objection to the doctrine of the human race springing from a single pair."[5]

[1] Isidore Geoffrey Saint-Hilaire "Histoire Naturelle Generale," iii. p. 210.
[2] Prichard "Natural History of Man," i. p. 17.
[3] "Ethnological Journal," p. 98.
[4] "Method and Results of Ethnology."
[5] "Antiquity of Man," xx. p. 385.

Gœthe was the first, Professor Helmholtz says,[1] who laid down with precision and confidence, that all differences in the structure of animals must be looked upon as variations of a single primitive type, induced by the coalescence, the alteration, the increase, the diminution, or even the complete removal of single parts of the structure; the very principle, in fact, which has become the leading idea of comparative anatomy in its present stage. Mr. Darwin thinks "there is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one."[2] Professor Huxley says—"All existing species are the result of the modification of pre-existing species, and those of their predecessors; and it is probable, though not a necessary consequence of this hypothesis, that all living creatures have arisen from a single stock. . . The vast series of extinct animals is not divisible, as it was once supposed to be, into distinct groups, separated by sharply marked boundaries. There are no great gulfs between epochs and formations—no successive periods marked by the appearance of plants, of water-animals, and of land animals *en masse*."[3]

The theory of Lamarck groups organic matter under simple forms. Their first outlines, altered by time and circumstances, successively give birth to radiated creatures, to the inferior mollusks, to articulate animals, to the lowest fishes, then to man. "Exercising an organ, gains development and extension which insensibly change it, until it becomes wholly different. On the contrary, the faulty use of an organ impoverishes it gradually, and ends by destroying it."[4] Birds, ceasing to fly, lose the power of flight. "This atrophy reaches its climax in the snakes. . . by the ribs and intercostal muscles having undertaken the work of the limbs."[5] Mr. Owen writes—"I am constrained by evidence to affirm that in the vertebrate, as in the invertebrate series, there is manifested a principle of development through polar relations,

[1] Gœthe's "Scientific Researches."
[2] "Origin of Species," Ed. 4, p. 576
[3] "Criticism on the Origin of Species."
[4] "Organisation des Corps vivants."
[5] "The Doctrine of Descent and Darwinism," Oscar Schmidt.

working by repetition of act, and by multiplication of life parts, controlled by an opposite tendency to diversify the construction, and enrich it with all possible forms, proportions, and modifications of parts, conducive to the fulfilment of a pre-ordained purpose and a final aim; these opposite yet reciprocally complemental factors co-operating to the ultimate result, with different degrees of disturbance, yet without destruction of the evidence of the typical unity."[1] Evidence may be multiplied to any extent. "Every cell, like every individual plant or animal, is the product of a previous organism of the same kind."[2] "Unity of plan everywhere lies hidden under the mask of diversity of structure." In plainer words—"To study the succession of animals in time, and their distribution in space, is to become acquainted with the ideas of God Himself."[3] "There is," says Dr. Geo. Combe, "scarcely a single page in my three physiological works in which God was not present to my mind. I regard the whole laws of animal economy, and of the universe, as the direct dictates of the Deity; and in urging compliance with them, it is with the earnestness and reverence due to a Divine command that I do it. I almost lose the consciousness of self in the anxiety to attain the end, and when I see clearly a law of God in our own nature I rely upon its efficacy for good, with a faith and peace which no storm can shake."

Life was evolved from no life—God evolved it; organisms from inorganic matter. Distinct provinces existed from the very earliest times; and whatever alterations arose, whether in plants or animals, seem to have been due to geographical and climatal conditions; not to automatism but by that energy of which all phenomena are manifestations. In some organisms there has been little or no change. The Globigerina, little builders of the vast chalk formations, were the same as those now found in the depths of the Atlantic Ocean; time has effected no change in them. The lizards of to-day are no better than those of the Permian period. The Labyrinthodonts cannot be rated under the living Salamander

[1] "Anatomy of Vertebrates," Intr. p. xxi.: Richard Owen, M.A., F.R.S.
[2] "Comp. Physiol.," p. 347: Dr. Carpenter.
[3] "Prin. Zool.," c. xiv.: Agassiz.

and Triton. The Devonian Ganoids are near akin to Polypterus and to Lepidosiren. We are not warranted in asserting that the earlier types, so far as known, were more degraded, or embryonic, in structure than their modern representatives. A long winged bird will sometimes hatch a longer winged ; a changing climate and variable conditions produce adaptations; where there is dry land not many aquatic creatures will be found; and those mechanical instruments, the hands of the ape, the hoofs of the horse, the fins of the whale, the trowels of the mole, and the wings of the bat, must obey the behests of animal will in their different elements ; but that rumination will come to an animal through long sitting, or that wings, trowels, fins, hoof, hands are common property and interchangeable by animal will is not credible. Every life conditions its own form ; and the power of adaptation, from within and from without, has reflex forcible action : but the so-called persistent types, both of animals and plants, have sustained very little apparent change from their first appearance to the present time. In those which are not persistent, there is a resemblance of arrangement, as also of order and character in the succession. The wonder is that the changes have been so small; not that they have been so great.

The only safe and unquestionable testimony we can procure, fails to show positively "any sort of progressive modification towards a less embryonic, or less generalised type, in a great many groups of animals of long continued geological existence. In these groups there is abundant evidence of variation—none of what is understood as progression ; and, if the well known geological record is to be regarded as even any considerable fragment of the whole, it is inconceivable that any theory of a necessarily progressive development can stand, for the numerous orders and families cited afford no trace of such a process." [1] An impartial survey of ascertained truths negatives those doctrines of progressive modification which suppose a necessary progress from more to less embryonic forms, or from more to less generalised types. " If the earliest fossiliferous rocks now known are coeval with

[1] " Persistent Types of Life :" Prof. Huxley.

the commencement of life, and if their contents give us any just conception of the nature and the extent of the earliest fauna and flora, the insignificant amount of modification which can be demonstrated to have taken place in any group of animals or plants, is quite incompatible with the hypothesis that all living forms are the results of a necessary process of progressive development; entirely comprised within the time represented by the fossiliferous rocks. Contrariwise, any admissible hypothesis of progressive modification must be compatible with persistence without progression, through infinite periods."[1]

With regard to the length of time claimed for development of the higher organisms: no such length is needed. The high and complicate human organism arises, in course of a few months, from a simple cellular state through many transformations; from a seed, like a plant, into structure and condition, like some of the lower fishes; thence, into amphibious kind; then, as a mammal; and by last progress of all—a man. The embryonic development is a rapid succession, in general outlines, of different and advancing forms; but there is not such exactness that the embryonic man is a plant, or a fish; he is neither: therefore, though these leading characteristics are said to require myriads of ages in the plant, and in the fish, the assertion that myriads of ages are required for the production of man through many bestial conditions, of beast through vegetable stages, and of the higher through lower vegetable organization, is unwarranted.

Similarity of parts in organisms, and like phases in the embryonic state, are not proof of the universal evolution of higher from lower forms. As for man, the lower organisms are living figures of his every part and state. As for animal and vegetable characteristics, they so intermingle that in the lowest forms no separation seems to exist; nevertheless, an invisible essential difference does exist. In those organisms the Monera, Amæba, etc., which change their form every moment, we are as little able to point out a definite fundamental form; as we are to find it in shapeless, formless anorgana, such as non-crystallized stones: nevertheless, though

[1] "Persistent Types of Life:" Prof. Huxley.

we cannot find any essential difference in the external forms, or the inner structure of these living, or of these dead: there is this essential difference—one is living, the other is dead; and every living thing has its own path of life.

The energy imparting life to inorganic matter advances from various centres in definite lines and times, through various grades of organization to the highest varieties of dicotyledons and vertebrata. This progress and variety are not wholly of adaptation, and by the changing incidence of conditions: variations appear even when parents are the same, and their constitutional states the same: plants grown from the seeds of one pod are not alike; and in a litter of pigs, or of kittens, there is seldom uniformity of marking. Like organisms are not universally, nor even generally, found in like habitats; nor very unlike organisms in unlike habitats. Horses, cows, sheep, dogs, afford many examples of variety and improvement; and, but for this capability of improvement, the arts of the breeder and cultivator would be in vain. The rabbit is born naked and blind; but the hare is born covered with hair, eyes wide open, and ready to run for its life. "The unity underlying the differences of the hand, the paw, the fin, the hoof, great as it is, no more makes a man a dog or an ape, than it makes him an elephant or a seal."[1] A young chimpanzee and an infant child are somewhat similar, but the child grows into a man, and the chimpanzee becomes more bestial. "The higher a monkey goes, the more he shows his tail." The chimpanzee is limited to an intertropical climate, and requires an assemblage of certain trees producing certain fruits; but man is a denizen of all lands, from the torrid to the arctic zones. The letters and words of man's book of life are used in God's press for various other publications; but those other publications are no more a part of man, than is a scurrilous performance part of Milton's "Paradise Lost."

Rudimentary Organs.

A Doctrine, Dysteology, the uselessness or purposelessness of organs, is having the attention of scientific men. Almost every animal and plant, besides the obviously useful arrange-

[1] Cuvier, "Lecons d'Anat. Comparée," vol. i., 1799.

ments, has organs, or rudimentary parts, for which there is no use. Eyes which do not see are possessed by animals living in the dark, in caves, or underground. The eyes are good, but covered with a membrane so that no ray of light enters. Many are found in the caves of Styria and Kentucky, they have become blind through so many generations living in the dark, and not using their eyes. We do wrong to think that natural selection preserved the blind, and destroyed the seeing; because those having sight might be liable to "inflammation of the nictitating membrane;" for, indeed, the immense eyes of these blind rats are subject to the objectionable inflammation. There are rudimentary limbs in fish, in serpents, and the slow-worm has a shoulder apparatus. In plants sometimes the stamen, sometimes the pistil, is abortive. Sometimes only one side of the lungs is developed in animals, the other is a useless rudiment; and in all birds only the left ovary is developed to yield eggs. The mammary glands on the breast of all mammals are active only in the female, there are teeth in the embryos of many ruminants which are not developed, most of the higher animals possess muscles that are never employed, birds and insects have wings which are not intended for flight.

If some of these organs are in a state of atrophy through not being used, that partly explains the difficulty. If others are progressing, so as by evolution to advance in life, is this progress voluntary on their part? If so, explain it; If it is the natural process by what arrangement is it natural? The theory of natural selection does not explain the mystery: for rudimentary organs, and some stages in the slow process of change, are hindrances to the animal, losses, not gains. They are not as germs, so that if we amputate a leg a new one buds out; nor do they, as the lizard, possess power of newly forming a limb, or tail, where was no tail nor limb. A portion of the alimentary canal is in birds enlarged and indurated for trituration of food, and we think to explain it by saying, "The gizzard is simply an exaggeration of certain structures and actions which characterise stomachs in general," but over-eating will not form a receptacle for the surplus; nor quick and ravenous devouring lead to

the production of an internal grinding apparatus. Did the liver, pancreas, and smaller glands, grow up by the desire to eat, and was there then a co-operation to localise the excretions? Did the lungs expand themselves out of a hollow bud, and become an air-chamber—simple or compound; and, in fish, form the swim-bladder? To call them an integration or summing up of past adaptive processes, by which modifications were slowly acquired through many generations; is first to assume those modifications, and then to explain the lesser difficulty by a greater. The real cause is utterly unknown.

Many human emotions, probably all the sensual feelings, are found in the beast; and it is asserted, with some humour and much rashness, that the highest faculties of emotion and intellect are mere outgrowths from lower animal life. For example—the mother sense of all senses is Touch, and the parrot is the most sensible of birds because of its tactual power; but we may just as well say, "The parrot has great tactual power because it is one of the most sensible birds, and by the same intelligence evokes speech from otherwise discordant tones." A hawk, a raven, even a canary, may sometimes equal the parrot in intelligence. The elephant multiplies his experiences through the tactual range and skill of his trunk; but the dog, with less tactual power, is sagacious enough to be the friend of man. Feline animals are said to be more sagacious, because of their paws, than hoofed animals; but the horse, though hoofed, excels all the feline animals in the world. If prehensile lips are the cause of sagacity the cow ought to excel, for she has prehensile lips and a cloven hoof. No warrant, moreover, exists for believing that parrot, elephant, horse, dog, or cow, can educate itself to the surpassing of nature, and extend brute powers into the domain of human reason. Men, however, who lose the knowledge of God, can and do go down into a low animal substratum of being, and suffer loss. Not distinguishing the nobler organs and functions, they use them as if only of animal species; but God knows the difference, and holds men responsible for the use of that difference. He expects them to regard one another as rudimentary angels, rather than progressive beasts: for an angel may be called man in-

corporeal, and man an angel corporeal. He is animal in so far as he partakes of precedent forms; and in so far as an animal is a plant, and a plant is inorganic; but, as a reasonable creature clothed with body, and formed in the image of God, he is but little lower than the angel.[1]

The whole of Nature, thus viewed, is in every part interpenetrated by the Supernatural; or, if you will, the Supernatural is Natural: for all things blend in one splendid unity. That which we call miraculous may be the working of a law so fine, yet wide and intermittent, that only highest wisdom can comprehend and use it. The discoveries of science are true revelations of the Divine presence and work, are a psalmody in praise of His Wisdom and Might. Our life, rooted in the Divine Life, is a mystery, a holy thing. Mere animal minds die, human minds are immortal; this is part of their grandeur, and, ever growing into wider range, subordinates intellectual to moral perfection. Our cosmical life, brought out like lower animal-life, from simple elements by the Almighty, is springing, through strange interaction with things around, to complex powers and desires; we are becoming involved, deeper and deeper, with great principles of moral government, and with a future wherein holiness will be vindicated.

[1] Comenius said the same thing long ago:—"Homo dici potest angelus eo sensu, quo homo ipse animal, animal planta, planta concretum, etc. dicitur id est, propter inclusam præcedentis formam, nova solum superaddita perfectione. Homo enim creatura est rationalis ad imaginen Dei condita, immortalis; est et angelus, sed majoris perfectionis ergo a corpore liber. Nihil igitur aliud est angelus quam homo a corpore nudus, nihil alind homo, quam angelus copore vestitus."—John Amos Comenius, Physicæ ad Lumen Divinum Reformandæ Synopsis.

STUDY XV.

COMPARISON OF THE TWO DIVINE ACCOUNTS.

"In the spiritual childhood of the world, outward signs were needed to make known God's power and rule. The secret springs of the machinery were displayed; but, when the fulness of time was come, men were no longer to walk by sight, but by faith."—*Memorials of a Quiet Life.*

THE world is that theatre on which the drama of our life is played. Possibly we should not trouble ourselves with what goes on behind the scenes, unless fresh influxes from the region beyond our own experience, and beyond our ancestors' experience, came in upon us as from an ocean, surrounding our island world. Reflection on the nature of things also discloses that there are two modes of existence, and on two different planes: Real existence, which we feel or perceive; and Ideal, that which is imaged in our consciousness, or of which we have conception. Conscious, in this manner, of existence, of co-existence, of pre-existence; the necessary movement of thought is with the flow of things, and we cannot conceive of a creation without a Creator, nor of effect without cause. We carry, so to speak, a universe within us, and a measure for all things. Deep as is our conviction of the reality of a world behind the field of phenomena, we are puzzled by statements that it stands in no relation to us, nor have we faculties by which to know it.

Both statements we utterly deny. It is possible to reduce all phenomena to one cause, to see the many in the One, and the One in the many. The ablest metaphysicians say—"The phenomena we deal with are bi-polar, on the one side objective and on the other subjective, and these are the twofold aspects of reality:" that double-sidedness which enforces the conviction that to the positive equation of the world must be added the spiritual equation, as that inner meaning which explains the whole. For example, to account for the consciousness we

possess of God, of Sin, of Responsibility, of Eternity, as were they pure creations out of nothing—utter fictions, is equivalent to supposing that the human race issued from Adam and the sons of Adam, without the co-operation of Eve and her daughters. We know these things not only as a revival of experience by our race in former ages, but by our own feelings or consciousness; and, as all the parts of nature are analogous or cognate, we are going through that experience which others have gone through, learning that the world within man and the world without man are equally a revelation or manifestation of the Almighty.

This knowledge is not without but within us, a revelation from Intelligence to intelligence; and by means of an organ which, though restricted within the sphere of experience, is enabled to apprehend, though not comprehend, concerning the supra-sensible and supernatural. There is a faculty which, by means of successive reaches in symbolical procedure, as in mathematics, enables pious men so to condense sensible experiences, that they attain a prevision in spiritual things like the astonishing previsions of exact science. The truth of this may be discerned in the character and works of Moses, and in the narratives of creation.

There are two separate Scriptural accounts of creative work, which, through want of sufficient critical skill, have been wrongly considered as varying and erring records by two different writers. The former account (Gen. i.-ii. 3) is a brief summary or symbol of creative acts. The latter account (Gen. ii. 4-22), after reference, in verse 4, to the creation of the world, describes the planting of Paradise, and particularises the fashioning, temptation, and fall of man. The former, in which the Divine name is Elohim, אֱלֹהִים, shows God's relation to all things as the Creator, Owner, Lord of the universe. The latter, where we find the name or names, יְהוָה אֱלֹהִים, Jehovah Elohim, represents the Lord, the eternal and infinitely powerful: the Father is God in His own Essence, the Source and Foundation of all; the Son is the Mediating Principle, the Deliverer, or Saviour; the Spirit is the active Principle effectuating that relationship; all, of course, included in Jehovah Elohim.

The first chapter being Elohistic, and the second Jehovistic or Jahvistic, affords no conclusive evidence that the two accounts are not by the same author. In the Pentateuch, Histories, and Psalms, one and the same writer will be found to use both names. An occasional appearance and disappearance of the sacred name, Jehovah, accords with the intense reverence in which it was held. Not only so, Elohim, Mighties, is a more suitable word in describing creation; even as the name, Jehovah, gives a more touching character to redemption, and represents the Divine Personality.

The evident contrariety of statement, both as to matter and manner, is proof of difference as to the writer's aim. The proof can be given in detail:—

In the first chapter, six days form distinct periods or eras of creative operation. In the second chapter, as if to show that the works of God are one work, and the days of God are one day—all the days become one—"the day that the Lord God made the earth and the heavens."

The first chapter, after stating that God is the Creator of all things, describes the use of means in development of the earth. The Spirit moves upon the waters: the chaotic fluidity was not water, such as we are now acquainted with, which could not collect until after the appearance of light, nor until the glowing earth began to cool on its surface; and light appears as the result. Light may be regarded as that means of effectual operation by Divine energy, when will was enunciated, as figuratively expressed, by word. The firmamental expanse was cleared, the waters were gathered into seas, continents and islands were formed. Afterwards, the earth put forth that vegetal power by which sea and land were replenished; the earth being that fruitful mother, able, by energy, to give birth to plant and to animal, as we now say, "by natural power"—all being done according to law. By law is meant that order and sequence, of varying intensity and rapidity, now called natural.

In the second chapter, the admirable mechanism, and the work which was wrought by it, are specially ascribed to a personal God. As if the notion of Democritus had been foreseen and corrected,—"All life and change are due to the com-

bination and separation of molecules;" as if the thought of Lucretius was anticipated and reproved,—"Nature is seen to do all things spontaneously of herself;" and, as if the error of materialists had been prophesied of and condemned—"Matter is the universal mother"—we are plainly told, "The Lord God made the earth and the heavens, and every plant of the field before it was in the earth, and every herb of the field before it grew: for the Lord God had not caused it to rain upon the earth, and there was not a man to till the ground." Not from man was the pleasant pasture; nor did the mechanism and beauty of herb and flower proceed from the earth; nor is the exquisite structure of animals due to the ground—the Lord God made them all. Eden, delightful for situation, was Divinely chosen and planted.

The word תּוֹלְדוֹת, "Generations," heading the second narrative,—"These are the generations of the heavens and of the earth when they were created, in the day that the Lord made the earth and the heavens"—is not to be understood as giving an account of the original beginning, but taken in the sense of one thing proceeding from another, as (Gen. v. 1), "This is the book of the generations of Adam;" and (Gen. x. 1), "These are the generations of the sons of Noah."

The growth or advance speedily assumes an intense mystical signification. The Garden has to be dressed and kept, not merely to be kept from running wild; the meaning of dressing and keeping is deeper than that of trimming flowers. The Tree of Knowledge and the Tree of Life are mystical tokens of development; the command not to eat is a warning against evil; and the entrance of a Tempter shews the need of these teachings, warnings, and premonitions concerning human duty, responsibility, and peril. The service and disservice, the submission and rebellion, the temptation, fall, and death of man, are those things proceeding from one another of which this chapter records the generation.

These generations are connected with a change in the name of God. He is not simply אֱלֹהִים, God, as He stands to matter, and to unintelligent life as the Divine energy, but אֱלֹהִים יְהוָה, Jehovah Elohim, God known to Man, the Personal the

Covenant God to whom obedience is due, the Promiser and Restorer.

"God had not caused it to rain"—is not a denial of previous rain, but an assertion of the Divine origination of plants and animals. Paradise may have been a rainless, not treeless locality; but we do not understand, if so, why the dense warm vapour did not condense into rain. The statement signifies—Things did not exist of themselves, nor merely by the fertilising influence of rain. In the mind or wisdom of God every plant was created before it existed. The ideal first, after that the reality. The whole was conceived and spiritually wrought out before there was any rain. That rain did fall is certain. The Divinely ordered constitution of nature required it. Rain-drops fell on sand, mud, soft clay, and left their marks on the sea-shores of the ancient world; and the rocky legend proves, by the shape of these little indentations, that long before man appeared the meteorologic state of the earth as to rain, wind, cloud, electricity, was the same as now.

"There went up a mist from the earth, and watered the whole face of the ground"—may be limited to Paradise. The dew is plentiful and rain is scanty in those parts where God's Garden is supposed to have been planted. We prefer this interpretation—The plant and herb were not created by growth-power of the earth, nor by the fertilising influence of rain, nor had man to do with them; they were God-made. The argument is,—There was no rain, nor any power in rain, to form of themselves the exquisite and marvellous herb; nor was there any co-operation of man; God formed it, and with dew refreshed it. The origin was in that energy, above and beyond nature, which comes down into nature.

The view given above as to the distinct and separate purposes for which both accounts are given is confirmed by one from whom we little expected confirmation,—he writes of the first, "None but a professed mystifier of the school of Philo could see anything but a plain statement of facts;" but "the circumstances related in the second narrative of creation are indeed such as to give at least some ground for the supposition that a mystical interpretation was intended to be given to it."[1]

[1] "Essays and Reviews"—Mosaic Cosmogony: C. W. Goodwin, M.A.

It would have been well had the writer sought out this mystical meaning; he might have found the true interpretation of the second narrative, and been preserved from the error of counting it a mere repetition of the former, and by a feebler hand. The chief purpose of the mystery, we venture to suggest, is to give in concrete form, so far as the nature of the thing and human capacity allow, an account of man's departure from the Almighty. The reality under the figure, and the figure with underlying reality, are that awful spectacle, the growth and consequences of spiritual depravity, which no man, with unveiled face, can safely look upon.

The fact, moreover, of the second narrative being mystical affords matter for study to those who say—"Your belief and our science are not possible in the same mind. Why the stupendous miracle of no rain on that spot of spots, Paradise —so beautiful in verdure—so rich in animal life? Rain must have fallen, even before the sea collected in mass: the existence of continent, of island, of river, necessitated the action of rain and denudation." We also, as men of science and of faith, must be at one with ourselves—intellect and emotion be duly content. Making, therefore, no attempt to explain the miracle—if miracle there was—not insisting even that Paradise was a rainless locality, regard the garden and the planting, the trees of life and of knowledge, the formation of the woman, the visible appearance of the serpent and audible speech, as symbolical statements and embodiments to give simplicity and clearness to common understandings concerning spiritual transactions. Not the less but more real because spiritual; not weakened in truth because the whole may be recorded in allegorical form; not losing intensity of power, of meaning, of sacredness, because God arranged the Divine Plan as a landscape and placed His own and human doings in a garden, but living and moving before us. While thus putting the whole, so far as possible, in a form acceptable to scientific minds, we all do well to remember our Lord's words—"Thomas, because thou hast seen me, thou hast believed: blessed are they that have not seen, and yet have believed."—Jno. xx. 29.

Further, that the two accounts were written for distinct and

separate purposes appears plain from—(1), Facts left out; (2), The enlarged and varied arrangement of facts, in the second narrative.

1.—*Facts left out.*

There is no mention of the earth being originally without form and void, nor of darkness upon the deep, nor of the command, "Let there be light." The fact of creation is simply stated: the moving of the Spirit, the ordination of day and night, the formation and operation of the firmament, are not spoken of; nor the gathering of water into seas, nor the appearing of dry land. Sun, moon, stars, are not even named, whether as lights or rulers. Creation of fish in the water, and the image of God in man, are passed by; nor is there any mention of the Sabbath. We are told, "It contains no error of cosmical science."[1]

2.—*The enlarged and varied arrangement of Facts.*

There is no separation of days, they are all one day, chronology is not thought of. Birds brought forth by the water (i. 20) are placed (ii. 19) with the animals, and formed out of the ground. The latter statement is not incorrect, for though science affirms that fish were the progenitors of birds, not immediately, but through the lizard, they may be said to come from the ground as mother of all things. Animals are placed after man, and woman is formed of man, not with man from the ground. The special mention of woman, and the words, "Therefore shall a man leave his father and his mother, and shall cleave unto his wife," are undoubtedly to sanctify marriage, and to make the position of woman one of purity and safety as to her husband. It is hard, indeed, to resist the conviction that the whole is a proemium to the narrative of temptation and ruin, and of redemption from ruin. Adam and paradise, temptation and transgression, ruin and redemption, are the central objects. Geologist, astronomer, or theologian who attempts to explain the Hebrew narrative, is bound to take it with all belonging to it. The entrance of evil is proved by a world of sadness.

[1] "Notes on the Earlier Hebrew Scriptures," p. 16: Sir G. B. Airy, K.C.B.

Consider somewhat more deeply the nature and meaning of the second narrative.

Man is "a living soul," נֶפֶשׁ חַיָּה: the living or efficient soul in the flesh—body and soul being one man. Sometimes, as the soul is the efficient or chief, it is taken as title for the dead (Lev. xix. 28). The soul is not an exile from happier existence, and placed in the body to do penance for formerly committed sins, but is that which the self-movement of God Himself called into being by effectual interference when He made man. We rightly say—the cause was God. The material of the outer body was earth. The inner spiritual ground or consciousness was fashioned into the Divine form, image, or likeness, by Inspiration. The effected object was a human form, of flesh subsisting, with inner Divinely embodied spirit. If there was any man before this, he was not a true man.

The peculiarity separating the real man from animals and angels, is that animals have a nature which is wholly used up in the necessary expenditure of life; but man, being spiritual, is not expended in natural use; angels are in the image of God, being sons (Job i. 6, xxxviii. 7); but man, the earthly one, in God's likeness has a bodily form. This—which leads some of us erroneously to regard God as man-like, because we, in a sense, are God-like—means that the spirit-embodied man, being exalted above the material world yet not purely spiritual, stands between the impersonal bodily world and the personal bodiless spirits as the connecting link of all created beings (Ps. viii. 5, 6). Not only so, man being a law unto himself, while God was shining forth in his spirit, his life was in very deed the vision of God. This light was quenched in the Fall, and life became a dead life; but the living spirit, though in moulded dust, subsisted: that by restoration in Christ we may be transformed again and daily assimilated to God. Thus viewed, man is God-man, and when laid in the grave, is that grain of wheat out of which springs, by Divine energy, perfect and glorified humanity. In Christ's life, death, and resurrection, there is a manifest oneness with our own. In the Scriptural sense, we live and die in Christ, in and with Christ are buried, in by and with Christ we rise from the tomb, ascend to heaven, and dwell with God.

Cattle, reptiles, beasts of the earth, are called "living sôuls;" but there was no embrace of love, no breath, no special moulding in their creation. They grew, every one after his sort, having life from God—nutritive life, sensuous life, but all by means of the earth. There was no in-breathing, whatever that may mean, nor spirit from Jehovah, whatever that may convey. As to man, there was creation of body, enduing with life, and inspiration of soul.

Scripture traces man no further back than to Adam, from whom we all proceed. Adam is placed in paradise to dress and keep it. Through some strange influence, a brute becomes an intelligent speaking creature, a means of temptation, and a power by which man, who was to subdue evil, is himself overcome by evil. If the whole be counted an allegory, the underlying truth is not the less intense or real. The world, in consequence, seems a mingling of wrath and love, but love has supremacy; and Satan, who had been banished into narrower dominion (2 Peter ii. 4), thus setting himself to war against man (Eph. vi. 12), is to find that man whom he abused—man who began with lower powers, made yet lower by sin—shall attain to higher state than even that from which the tempter himself originally fell (Heb. ii. 5).

Man is called "Adam," אָדָם, earth, because of the earth was formed that body which became a vessel to contain that life of the spirit and soul which is the image of God. Adam is the earthly one, in contrast with that second Adam who is the Heavenly One. The former was a living soul, the latter a quickening spirit (1 Cor. xv. 45). One is the likeness of God in an earthen vessel, the other is the likeness of God (Phil. ii. 6) in brightness of glory (2 Cor. iv. 6, 7; Heb. i. 3). Adam, and we in him, are not only in the form of God, but it is characteristic that, being in the form of God, we are still men: for Christ, by regeneration, is God-man; and we, through Christ, are by regeneration God-men. This confirms the fact of our kinship with the whole earth, and the promise of our elevation above the earth into the "house not made with hands." Hence, man is as other earthly things, yet above other earthly things. He lives,

in twofold relation: first, to all natural and physical life by special operation; and secondly, in Divine kinship and communion by inspiration.

If we draw a little nearer, the truth appears in this form: the entire life of nature, in its reciprocal action and varied powers, has unity in and from the great Architect. The vegetative life is subordinated to the animal life, and the animal to the spiritual. The human body contains all the powers of previously existing life; and these, being combined by special operation, constitute that organic individuality into which the Lord breathed: not making man a part of Godhead, but creating a spirit of likeness to the Godhead in moral and intellectual power. At our death this created spirit is separated from the mortal, and at our resurrection is joined to the immortal body. The soul is the body of the spirit, the flesh is the body of the soul; and so far as our soul is animal, it is the informing part of that which is corruptible; and in so far as it is spiritual, or the vessel containing the spirit, it is called the inner man.

The narrative is the simplest story ever told, suited for the childhood of our race, and for children now, yet the grandest ever written, the most mysterious ever conceived. We have in it "truths that perish never," requiring thousands of years for fulness of growth. Many a discovery in science died, like a thing born out of due time, and lived not again till ages had passed away. These living things never die. They are a song of strangest sweetest melody which saddened yet gladdened the purest spirits of our race: God's psalm of life, giving glorious ideas, making deeps where was no depth nor inwardness.

No argument as to the verity of these narratives—the former in historical reality, and the latter as containing symbols of mysterious and spiritual, yet actual events—will be deemed conclusive without the evidence derived from the cuneiform inscriptions, or "Chaldean Account of Genesis." The discovered tablets are fragmentary, and in a mutilated condition; not one is complete, and only a general view of the whole subject can be obtained. The inscriptions agree with the Scriptural account of Creation, and of the Fall; and

it is conjectured that every creative day had its own tablet. Taking the best known arrangement of the fragments, according to subjects,[1] we have—

1. An account of chaos and generation of the gods.
2. A fragment, perhaps of the second tablet, on the foundation of the deep.
3. The creation of land.
4. Part of the fifth tablet, giving the creation of the heavenly bodies.
5. Fragments of the seventh tablet, giving the creation of land animals.
6. Fragments of three tablets on the Creation and Fall of Man.
7. Fragments of tablets relating to the war between gods and evil spirits.

The translation of the fragments of the first tablet is :—

1. "When above, were not raised the heavens ;
2. and below on the earth a plant had not grown up ;
3. the abyss also had not broken open their boundaries ;
4. the chaos (or water) Tiamat (the sea) was the producing-mother of the whole of them.
5. Those waters at the beginning were ordained ; but
6. a tree had not grown, a flower had not unfolded."[2]

The other translated portions—except 8 "a plant had not grown, and order did not exist"—refer to the creating of gods.

The three next tablets in the creation series are absent, there being only two doubtful fragments of this part of the story."[3] It is conjectured that they contained an account of the bringing forth of light, of the firmament, of dry land, of plants.

The fifth tablet gives the creation of the heavenly bodies as contained in Genesis under the fourth day ; and a subsequent tablet, probably the seventh, records the creation on the sixth day. This double example leads to the inference that every day's work was recorded on a separate tablet, and in the Genesis order of the days. A tablet, thought to be

[1] "The Chaldean Account of Genesis," pp. 62-100: George Smith.
[2] "The Chaldean Account of Genesis," pp. 62, 63 : George Smith.
[3] "The Chaldean Account of Genesis," p. 67 : George Smith.

the eighth, appears to state the Creation and Fall of Man. There are several other tablets, but very mulitated; and no number can be positively proved beyond the fifth tablet. In the Babylonian account, the moon is created before the sun.[1] As to the fragments regarding man, one fragment might belong to the purest system of religion, but mutilations render the sense uncertain. On another fragment is an account of the curse after the Fall.[2] "The obverse of the tablet giving the creation of man when it breaks off, leaves him in a state of purity, and where it recommences on the reverse man has already fallen."[3] "The word 'Adam,' is not used as a proper name, but for all mankind. The Tree of Life seems referred to as the grove or forest of the gods. The dragon of the sea, answering to the serpent in Genesis, is connected with the Fall, bringing it about, and sharing the curse.[4] He is conceived of as a spirit of evil, self-existent and eternal, belonging to the original chaos, opposed to and older than the gods." "He is 'the intelligent guide,' or, according to another interpretation, 'the intelligent fish,' the 'teacher of mankind,' 'the lord of understanding.' One of his emblems is the 'wedge' or 'arrow-head,' the essential element of cuneiform writing, which seems to be assigned to him as the inventor, or at least the patron, of the Chaldean alphabet. Another is the serpent, which occupies so conspicuous a place among the symbols of the gods on the black stones recording benefactions, and which sometimes appears upon the cylinders. This symbol, here as elsewhere, is emblematic of super-human knowledge—a record of the primeval belief that 'the serpent was more subtle than any beast of the field.'"[5]

The Assyrians, who made these tablets, acknowledge that they borrowed from Babylonian sources. The greater part being copied in the age of Assurbanipal, B.C. 670.[6] It is certain that the Babylonians in the period about B.C. 2000 to

[1] "The Chaldean Account of Genesis," p. 75: George Smith.
[2] "The Chaldean Account of Genesis," pp. 82-85: George Smith.
[3] "The Chaldean Account of Genesis," p. 86: George Smith.
[4] "The Chaldean Account of Genesis," p. 90: George Smith.
[5] "The Five Great Monarchies of the Eastern World," vol. i. p. 154: George Rawlinson, M.A.
[6] "The Chaldean Account of Genesis," pp. 22, 28: George Smith.

1500 believed in a story similar to that in Genesis.[1] We may, therefore, regard it as settled for ever that the Bible account of the Divine Creation of Man and of his Temptation and Fall of Man by means of an evil spirit or serpent, are not modern inventions. It follows that the doctrine of redemption recorded by Moses (Gen. iii. 15) in connection with the Transgression and Fall, disposes of the error as to Christianity having been evolved from human consciousness, apart from Divine or Supernatural influence. The essentials of our faith are foreshadowed in the primeval record.

The superiority of the Mosaic record may be seen by reading, as specimen, a fine passage from fragments of the fifth tablet, an account of the fourth day of creation."[2]

Obverse—

1. "It was delightful, all that was fixed by the great gods.
2. Stars their appearance (in figures) of animals he arranged.
3. To fix the year through the observation of their constellations,
4. twelve months (or signs) of stars in three rows he arranged,
5. from the day when the year commences unto the close.
6. He marked the position of the wandering stars (planets) to shine in their courses,
7. that they may not do injury, and may not trouble anyone,
8. the positions of the gods Bel and Hea he fixed with him.
9. And he opened the great gates in the darkness shrouded
10. the fastenings were strong on the left and right.
11. In the mass (*i.e.*, the lower chaos) he made a boiling,
12. the god Uru (the moon) he caused to rise out, the night he overshadowed,
13. to fix it also for the light of the night, until the shining of the day,
14. that the month might not be broken, and in its amount be regular.

[1] "The Chaldean Account of Genesis," p. 100 : George Smith.
[2] "The Chaldean Account of Genesis," p. 69 : George Smith.

15. At the beginning of the month, at the rising of the night,
16. his horns are breaking through to shine on the heaven.
17. On the seventh day to a circle he begins to swell,
18. and stretches towards the dawn further.
19. When the god Shamas (the sun) in the horizon of heaven, in the east,
20. . . . formed beautifully and . . . . .
21. . . . . to the orbit Shamas was perfected
22. . . . . the dawn Shamas should change
23. . . . . going on its path.
24. . . . . giving judgment
25. . . . . to tame
26. . . . . a second time
27. . . . . .

Now read from the Bible, Gen i. 14-19, "God said, Let there be lights in the firmament of the heaven, to divide the day from the night; and let them be for signs, and for seasons, and for days, and for years: And let them be for lights in the firmament of the heaven, to give light upon the earth; and it was so. And God made two great lights: the greater light to rule the day, and the lesser light to rule the night; he made the stars also. And God set them in the firmament of the heaven, to give light upon the earth, And to rule over the day and over the night, and to divide the light from the darkness: and God saw that it was good. And the evening and the morning were the fourth day."

It seems hardly credible that the determined resolve to be rid of miracles, inspiration, prophecy, everything supernatural, should lead any man to regard Moses as having obtained his theology and cosmology from a jumble of serpent worship, devil worship, and Babylonian myth; yet, "some have gone so far as to argue that the Mosaic account was derived from it. Others, who reject this notion, suggest that a certain 'old Chaldee tradition' was 'the basis of them both.' If we drop out the word 'Chaldee' from the statement, it may be regarded as fairly expressing the truth. The Babylonian legend embodies a primeval tradition, common to all mankind, of

which an inspired author has given us the true ground-work in the first and second chapters of Genesis."[1]

There are a few persons who say—"Theologians retain the Genesis account to prop up the theory of the Fall and of Satan's personality—retain it against reason; and if the book of any other religion gave an account of a speaking serpent, and of woman formed from the side of man, the whole would be counted an absurdity." Doubtless, but these marvels are certainly true in their spiritual meaning, really live in moral and physical events now operating; and are written in a manner so as to be understood by children, yet with depths for profoundest minds; are related in a Book which holds and will hold the world in awe; are connected with a scheme wonderfully comprehensive and mysterious; indeed, are the only accepted narrative which sufficiently explains the sin, the misery, the past and future of mankind. Take away the ancient narrative, deny the recorded events, refuse the essential meaning, and assert that there is no record of the earthly being so acted upon in primeval man that, as with men now a days, higher powers received damage, and what then? You are without any explanation of that in man which leads to devil-worship, and of those almost universal traditions which relate of sin entering by means of an evil principle. Nor do you get rid of marvels; the gradual growth of the universal mind of humanity, as asserted by some philosophers; and the redemption and sanctification affirmed with better authority by Christians; are nobler works, more lustrous in beauty and goodness, greater marvels, than any old wonder. The most practical men that the world has ever seen do consequently maintain that the knowledge of those old mysterious transactions were handed down to Moses through a tradition which had become the almost exclusive possession of the few who retained their faith in the primitive religion. The same being confirmed and probably enlarged to him by new revelation.

In full confidence we retain our faith, revere the narratives, the ceremonies, the symbols in which it is embodied; and our confidence is further warranted because the verity and reality of both narratives are seen in the spiritual building

[1] "The Five Great Monarchies," vol. i. p. 182 : George Rawlinson, M.A.

which Scripture erects. The creation of heaven and earth is the fact on which rests the declaration that we shall see a new heaven and a new earth (Rev. xxi. 1). The beginning of all things is treated as the beginning of manifestation concerning the mystery of the Divine nature (Jno. i. 1). The Spirit brooding over the waters and bringing forth life. prefigures the continual operation of God in our souls (Jno. iii. 5). The springing up of light is an analogue of the glory and the light which we hope to see by in the city of God (Rev. xxi. 23). The birth of land from the sea (Gen. i. 9) reminds us of all things being made new, and of there being no more troublous things like the sea (Rev. xxi. 1). The springing up of plants (Gen. i. 11) is a figure of the tree with food for all nations (Rev. xxii. 2). The sun and the moon and the stars shining with light, as of the star that led the wise (Mat. ii. 2), are a witness of mystery not yet fully known (Rev. xii. 1 ; xxi. 23). The Sabbath rest is symbol of the rest that remaineth (Heb. iv. 9, 10).

The first narrative is full of spiritual reality and instruction, extending from the fact that God did frame the worlds (Heb. xi. 3), until it arrives at the startling statement that this frame encloses a spectacle of such vast import that angels are instructed by it (Eph. iii. 10).

The reality underlying the second narrative manifests itself not only in the symbolistic and allegorising exegesis of patristic theology, but especially in Holy Scripture, and in souls of spiritual understanding. Who will forego the hope which is set forth in the fact of paradise? (Lu. xxiii. 43). From the ground, out of which we were formed, we shall again arise, re-formed, other than this body, of a higher stuff: our personal identity residing within the inner man, not the earthly outside (1 Cor. xv. 24-44). In material substance we are like all flesh, yet all flesh is not the same flesh, even as the stars are not all suns (1 Cor. xv. 39, 40). The rivers of paradise all flow into one river of life. The tree of death by the tremendous death on Calvary, has become a veritable Tree of Knowledge ; and now we have access unto the Tree of Life with twelve manner of fruits. Not once, but a hundred times, are the actual facts, in their reality and their doctrinal

truth, recorded in the Pentateuch, the Psalms, the Prophets, the Gospels. All these fruitful interpretations would be unfruitful, and no interpretation, did they not grow out of the real actual germ—God made the world and all things that are therein.

The whole becomes more wonderful when compared with Auguste Comte's famous but erroneous law of scientific progress. Every science, he says, passes to perfection by three stages — the theological, the metaphysical, the positive. Biblical science is the very reverse of this, and founded on the most positive and simple statements which it is possible to make. The whole race of man, and afterwards Israel in particular, were dealt with in the directest, most real, and positive manner. Those were the true days of sacred positivism. He who doubts may compare the simplicity and reality of Genesis with the myths, poems, and rhapsodies of all other nations. From that positive was a transition into the metaphysical: the prophets are witnesses. Then appeared Jesus who, with perfect truth, established the world's theological school. His piety rested on true wisdom, and that wisdom was based on positive fact. The knowledge of it is like a view in a glass—yet not a view in a glass; it brightens and elevates the human mind into a likeness of the Divine Mind. Man's duty high and lifted up above the mists of human error, has the body of heaven in its clearness. Faith ascends to God—Creator, Redeemer, Sanctifier. Our will, if we are not unbelieving and rebellious, is becoming conformed to His Will; our thoughts are being fashioned by His Mind. When perfect in Christ, we shall be one with God, and He one with us (John xiii. 21-23).

"Oh, my friend,
That thy faith were as mine; that thou could'st see
Death still producing life! And evil still
Working its own destruction—could'st behold
The strifes and tumults of this troubled world,
With the strong eye that sees the promised day
Dawn through this night of tempest; all things then
Would minister to joy; then should thine heart
Be healed and harmonized, and thou would'st feel
God always, everywhere, and all in all!"—SOUTHEY.

STUDY XVI.

THE PRE-ADAMITE WORLD.

" Christian, try to solve the problems
Which life's mystery surround.
Why God made thee? Why He loves thee?
Where thou art, and whither bound?"
The Three Bibles (*Unpublished*).

THE account of creation, if a true account, is proved by that truthfulness to be Divinely inspired. Early unscientific thought could not, of itself, know or invent those deeply hidden facts of which accurate science has but lately obtained possession; and however clear the mind's eye of early contemplative genius, it could not, without Divine aid, see how the world was framed. A revelation of the fact that God did create the world is vastly important, and establishes the kingdom of God in the universe of matter, as the history and salvation of man establish it in the world of spirits. The revelation was made probably to the first man; and handed down to Moses through a tradition which had become the almost exclusive possession of the few who, amidst polytheistic systems, retained their faith in the ancient and pure theism of a more primitive religion. To Moses it was, doubtless, confirmed and probably enlarged by new revelation.

It is not a picture of the Divine action drawn by an ancient geologist, though there is agreement with the discoveries of geological science, both as regards the antiquity of the earth, and as to the process of its formation; nor was it depicted by man's imagination trying, in its own way, to account for nature's origin and phenomena. Imagination was used, but only as the faculty through which God made a revelation of Himself. There was knowledge, but not scientifically obtained as is our modern conception of the universe. "It is the production of a writer who seems to possess an acquain-

tance with natural history, and might almost be suspected of knowing some facts of geology;"[1] yet this acquaintance he could not possess. The simplicity of the words and deep accurate meaning agreeing with latest attainments of science; the painting of things which men could not have seen, and description of works which man could have no knowledge of; are from a human mind acquainted with the deep things of God.

The heavens were undoubtedly in existence when our earth was formed. The heavens are not the firmament, which was created the second day; nor are they simply the sun, moon, and stars, spoken of in the fourth day. Heavens may mean all these and many more. The apostolic word (Eph. iii. 10) declares that the manifold wisdom of God is made known by the earthly Church to angelic powers of heaven; as if to show that God's eternal world-plan did not begin with the earth, even as it will not end with the earth. Science tells us that star-formation is yet in progress; and Scripture states that the Lord is even now preparing mansions (John xiv. 2). It is not needful to inquire whether heaven may be a spiritual world, entering, enclosing, and extending far beyond all material existence. The Scriptural doctrine is, "long before the earth was fashioned for man, there were heavens, and morning stars, and angels; regions more glorious than the earth, heavens more ancient than the firmament; and heavenly inhabitants who excel in strength."[2]

There have been acts of a wonderful and startling character, of which we possess but few incidents, in the origin and fall of spirits (Job xxxviii. 12, 13; Is. xiv. 12; Lu. x. 18; John viii. 44; 2 Peter ii. 4; Jude 6; 1 John iii. 8). The fall of angels, as connected with our own early history, may be thus stated:—Man was placed in paradise to dress and keep it. The secret meaning of those service-words becomes apparent in the fact that a tempter became the cause of ruin. There was evil for man to overcome: evil outside of him, not human—but angelic or spiritual.

How far demoniacal malignity introduced or magnified

[1] "Notes on the Earlier Hebrew Scriptures," p. 14: Sir G. B. Airy, K.C.B.
[2] "Mosaic Record of Creation:" A. M'Caul, D.D.

suffering in the early animal world, Scripture does not reveal; unless the "wasteness or emptiness," spoken of in the second verse of Gen. i. mean, as some think, a caused or wasting desolation. In Jer. iv. 23, the words are used of destruction wrought as punishment for sin. In Isaiah xxxiv. 11, they mean an after-destruction of that which once had been beautiful. In Rom. viii. 20-22, we are told that the creation was made subject to vanity, not willingly but in hope. Nevertheless, the Scripture statement, "God did not make the earth to be waste," is verified by the six days' process. The earth was wasteness and emptiness, or, as translated, "without form and void," because it had not yet been shaped, nor fitted for living creatures. תֹּהוּ wasteness, is sometimes used as synonymous with אַיִן, non-existence, and הֶבֶל for nothingness. It is certain that all good operation, all healthful, orderly production, proceed from the Will of God; and that the Divine plan, working a conditioning influence, renders even wasteness and desolateness receptive of Divine energy. The disorder, in its degrees of evil, though made a means of discipline, is attributed to the agency, direct or indirect, of the devil and his angels; who, having fallen from their allegiance to God, sought evermore to mar His good work. Hence we know why wrath seems mingled with love; why there is pain, strife, death; why providence is that entangled maze, which only a faithful wise and loving heart can read aright.

The fall of angels, and their evil influence on men, must not be put away as poetical and figurative; there is meaning, and that of a most awful character. What it is, as to the earth, we are painfully conscious of in the sin of our race, in the continual conflict of flesh and spirit, and in the dread of judgment to come. The record of it is a true history of real acts, not a mythological account of natural disturbances, nor a personifying of processes and laws by which God worked. "Specially remarkable, miraculous it really seems to be, is that character of reserve which leaves open to reason all that reason may be able to attain. The meaning seems always to be ahead of science, not because it anticipates the results of science, but because it is independent of them, and runs, as it were, round the

outer margin of all possible discovery."[1] The numerous passages of Scripture which affirm or imply the existence and agency of extra-human and super-human orders, are connected with a vast scheme. Accurate study will give consistency to this evidence, dissipate many difficulties, and expand our knowledge of those mysterious beings with whom our own destinies are so marvellously involved.

The Pre-Adamite world, occupying innumerable ages, answers the request of geologists for vast duration; and allows, if need be, for Pre-Adamite men. If such precursors existed of the Adam-man, as the Adam-man preceded the Christ-man, they were brute men, in whom was no breath of God; but, at best, only life yearning for more life. It is just possible, that as plant and animal had their order; the more primitive of each being more simple, and those following, for the most part, more highly organised; there may have been rudimentary men formed, as Scripture says, out of the ground. These may possibly have lived on for many generations until, in fulness of time, they were regenerated or recreated as the Adam, our forefather. There are thoughtful men who accept this as not unscriptural, and as explanatory of a scientific difficulty. We will not say, as Delitzsch, "The man who, in the ape, greets his brother only a little left behind, must needs have first substantially brutalised himself, or he would rather shudder at this counterpart of his own degradation."[2] It is better to allow those who think that our structural resemblances to the nearest allied quadrumana are of a character indicating that both man and ape are derived from some earlier common stock, to state their opinion: the body being formed by a perfectly natural process, and existing so that—

> "The soul did but mean the breath,
> It knew no more;"

then came the divine gift of immortality by means of endowing the (σάρξ) flesh, with (πνεύμα) the spirit; thus the (σώμα) body, dwelt in by the (ψυχή) psyche, became, through (πνεύμα), the spirit a divine man. Hence, though descended from the brute, man is immortal by the birth of a spirit in

[1] "Primeval Man," p. 367: Duke of Argyle.
[2] "Biblical Psychology," part ii. sec. 1.

him which bridged the gulf between meanness and majesty. Since which time it has ever been—

> "More upward, working out the beast;
> Letting the ape and tiger die."

Be in no hurry to solve every difficulty. All the sciences, even those professing most accuracy, are surrounded by many and great mysteries. Every root of study is lost in the unknown, and every height of knowledge enters a transcendental expanse. All scientific men, in the course of life, change their opinions as to the mysterious agencies and complex mechanism of the world. It is well to accept as part of our discipline, and an exercise of faith, that we must watch and wait. The exact point of time in which it pleased the Eternal to create man cannot be ascertained, but if man had existed very many thousand years on the earth, whether in brute form or rational image, he must have left memorials; yet not a vestige is found of that assumed ancient life—not a relic of old bestial condition. All flint instruments are accounted for by a reasonable antiquity; and the savage forms of life, however degraded, were not brutal. The hypothetical advance of our race through stone, bronze, and iron ages, may fairly illustrate the advance of art; but not necessarily the growth of mind, nor "progression from blind force to conscious intellect and will." All primitive traditions commence life about the same era, and the oldest reliable historical record is the Hebrew, the right interpretation of which gives high antiquity to the genesis of man.

Savagery is a condition much further advanced from brute-life than is the cultured man from the savage; therefore, savagery and civilisation must be taken as lower and higher stages of the same formation. To assume the development of brute into savage, and to endow the brutal origin of the savage with all those elements which culture develops into the faith and science of a Christian philosopher, takes for granted and natural that which is without one example in the whole course of history. The best applied scientific treatment, however extended and systematic, cannot develop a brute into a human being; nor, when we have the human being, can we always civilise him—he generally perishes under the operation; nor,

having civilised him, can we by any sort of higher culture develop Homers, Miltons, Shakespeares, Newtons. The Divine narrative, that man was created with mental and spiritual capacities, contains fewer elements of real difficulty than those which cumber the brute-hypothesis.

Ancient records tell of our ancestors in caves, clothed with skins, and eating raw vegetables. The teeth in old skulls never exhibit caries. They are worn down flat, and therefore roots may have been as often eaten as flesh. We need not go to Lucretius for a large-boned, hardy, lawless race; nor, to poetic traces of culture beginning outside and ending inside the range of human memory; Scripture records that a child-like condition was the earliest stage; but the children soon became men. Prior to the classical age, the civilisation of Egypt culminated; behind it lay the progress of the pyramid kings; and, yet earlier, Scripture record shows considerable culture of that kind which belongs to a primitive people.

Advancing art, if piety is lost, corrupts simplicity. All historical civilisations are, indeed, notorious for the separation of worldly intelligence from piety, so that the true theory of mankind is, that both development and degradation have their place in history: but against the brutal or even savage condition of the primitive race exists the fact—"No example can be brought forward of an actually savage people having independently become civilized;"[1] and the result of European intercourse, during the last three or four centuries, has been the destruction rather than the development of barbarous tribes.

If we ask the counter question,—"Is there any recorded instance of a civilised people falling into a savage state?" the answer is, "Egyptians, Hindoos, Chinese, tracing civilisation back to a period more than five thousand years in the past, testify of a culture better than that now possessed." It is well known that impurity tends to degradation, and causes the loss of more than was gained by artificial culture. Ancient Grecian genius slumbers, and no cry can awake it. The modern Italian has long lost the proud state and place of the old Roman. The Hebrideans were for ages

[1] "Romische Geschichte," part i. p. 88: Niebuhr.

under the influence of comparatively high civilization, yet they lost it. The ancient Irish had a better style than that described by Fynes Morgan, about A.D. 1600. The lords of the wild, or "meere" Irish, dwell in poor clay houses, or cabins of boughs covered with turf. In many parts, both men and women have but a linen rag about the loins, and a woollen mantle on their bodies. "It turns a man's stomach before breakfast to see an old woman in the morning." There are instances of civilised men taking to wild life in outlying districts of the world; and degeneration acts more destructively on lower than on higher culture. The small knowledge and the few appliances of savage hordes render them peculiarly susceptible of degrading influences, and incapable of the efforts necessary to attain and maintain high physical and mental state. The colossal figures of hewn stone in Easter Island were shaped by ancestors of men now incapable of such gigantic works. Ancient Negro kingdoms of extended political organisation, preceded the existing small communities of blacks which possess little or no tradition of their previous greatness. The Red Indians were surpassed by the Mount-Builders, those former inhabitants of the Mississippi Valley. The Chinese and rude Indian, appealing to the authority of ancestors against modern civilisation and science, testify of a good time that is past. The degradation of Arabians and Spaniards is historic.

If it be said, "All these have fallen, but none became savage," the reply is crushing, — "The miserable Digger Indians of North America, the Bushmen of South Africa— persecuted remnants of tribes who have seen better days— are degraded into savage life. The Algonquin Indians look back to golden days, when life was less bitter and manners less rude.[1] The rough Kamchadal counts that the world has grown worse and is growing worse.[2] There is, indeed, abundant evidence of degradation and fall amongst nations. The splendid days of Augustine and Trajan were speedily darkened by clouds of ignorance when barbarians

[1] "Schoolcraft Algic Res," vol. i. p. 50; quoted in "Primitive Culture," Vol. i., p. 43, E. B. Tylor.

[2] "Steller Kamtschatka," p. 272; do., do.

subverted Roman laws and palaces. There is proof of degeneration, but not one example of any nation advancing from savagery to civilisation. If, moreover, modern savages are direct descendants of the primitive race, no man of science regarding them as a late development from brutes, they must be a degeneration from the old race; for the utter impossibility of civilising them destroys the hypothesis of evolution from brute to savage, and from savage to cultured man.

Sir Charles Lyell, in his "Antiquity of Man" (cap. xix.), argues that, if the original stock had been endowed with superior powers, inspired knowledge, and the improvable nature of their posterity, we should now, instead of digging up rudest pottery and flint implements, find sculptured forms surpassing in beauty the masterpieces of Phidias or Praxiteles, lines of buried railway and electric telegraphs, with astronomical instruments and microscopes, examples of perfection in art and science. He forgot that Scripture states the high condition was lost, and that men were degraded by iniquity. He forgot that history reveals, and relics from buried cities bring to light, a grand and very ancient civilisation; a civilisation of such splendour and power that we are apt to think the old builders were giants,—the moderns pigmies.

Those who prefer evolution as a more satisfactory explanation of man's origin, thinking thereby to avoid everything miraculous, do not get rid of mystery, nor of Divine interference; they, indeed, establish mystery and render interference perpetual: for as matter cannot create more matter, it is equally certain that vegetable life cannot of itself create animal life; nor can brutes, by any effort of their own, acquire the intellectual and moral powers of human beings. This is all that Christians contend for: not that men were created mechanics, astronomers, philosophers; but, having common sense, were childlike and of no experience. The laws of mind were the same in the days of Abraham's fathers as they are now. There was a making of men, and a marring of men, as they did good or evil—the evil tending to degeneration, the good advancing to civilisation. If civilisation became separated from faith and purity the people perished.

View the argument somewhat differently. There is definite progress not only in the genesis of the earth, but in the genesis of life. The advance is from darkness and chaos to light and beauty; from low forms of vegetation to the higher; from the life that swarms in water to the fish, the reptile, the bird; from the living creatures on land to those of increased definite complexity in structure and function; until, in man, we have intellectual and emotional changes. It would be in the highest degree unscriptural and unscientific to deny that the progress from the less special to the more specialised may have been wrought by means of natural orderly causes during a long course of time, and by well-nigh insensible gradation. So far, therefore, Evolution may have been that long creative process of organic advance, by minute increments, until perfection of form was attained.

Concerning this organic advance, experience shows that out of the general web of existence special threads may be drawn and woven into a new and peculiar pattern. The elements of the new organism, however differently arranged, are the same substances as contained in the original mass; neverthless, by new grouping surprisingly novel phenomena emerge. We do not think, when the physical motions of molecules are grouped in chemical actions, that any addition is made to the primitive energies; nor do biologists generally suppose, when physical and chemical actions are specially grouped and vital phenomena emerge, that any essential addition is made beyond that of the new grouping of old material and of old energy. So in the emergence or creation of man, and afterwards in the development of social life, there is no casting away of the old threads: they are rewoven into more beautiful patterns. As the flower which comes into existence, and grows by energy imparted by the sun, is but a reproduction of that which was imparted; so sentient organisms reproduce all that produced them, and—this is the mystery—something more in every advance: for without this something more could be no evolution from low to higher degree, from vegetable to mammal, from mammal to man. How long the process, how slow and gradual the development, science can but guess.

Scripture defines all these advances, wrought by means of

nature, as essentially a Divine process. Now, when despite the evident differences presented by light, heat, sound—as quantitative phenomena; they were, by a triumph of analysis, identified under one common form—undulation; it was a beautiful greeting of the spirit: so when Moses laid aside idolatry, gave up nature worship, identified all things as possessing Divinity in their origin and progress, there was that triumph of genius, that greeting of the spirit, which devout men and scientific men are alike bound to revere.

Undulations, however manipulated, will only yield undulations: nevertheless, out of things with limited and peculiar range are brought those varied aspects of existence and real existences which are impossible to uniformity, and are irreducible to one another. For example—our notion of light can never be resolved into that of heat, nor into that of sound, though all three are reducible to undulations. Noises are the irregular mingling of vibrations, and tones are that regular recurrence of vibrations out of which music is constructed: so, between heat and light, as undulations of æther, there is only quantitative difference; nevertheless æther, of luminous rapidity, beats in vain on the skin-nerves—no light is felt or seen; nor do transverse vibrations, of whatever rapidity, produce heat through the retina. Hence, essential differences grow out of original unity, and as this is impossible, for things equal in themselves are equal to one another, something must come in from without. Behind this complexity of visible and invisible facts is the whole universe; nor is any explanation possible without that greeting of the spirit, seen in the genius and piety of Moses, by which we are conscious that there is the Weaver's side of the tapestry. All flesh is not the same flesh, nor all life the same life, beasts are not low men, nor are their sensations capable of being prolonged into human intelligence and emotion.

Man, then, being man by God's creative energy acting according to law upon matter, fashioning it into life, and inspiring it with spirit, is that Adam, the tree of humanity of whom we are branches; is that living soul by whose soul our souls are kindled, as light at a light. Was this man the first man? We may argue, indeed it is seriously maintained by

some that אָדָם, Adam, is the word for Adamites; אִישׁ, man is the word for men, mankind, not Adamites. This will not hold as establishing two races: for Adam uses the feminine of the latter for Eve (Gen. iii. 16); and Eve uses אִישׁ, man, —"I have gotten a man" (Gen. iv. 1)—in speaking of Cain, her first born. The two words are often used in contrast (Ps. xlix. 1, 2; lxii. 9; Is. ii. 9; v. 15), but never as of separate races. "The daughters of men" (Gen. vi. 2) were certainly daughters of Adam, not of a savage pre-Adamite race. On the other hand, "the sons of God" cannot be children of brutal ancestry; for such to marry Adam's daughters would be an elevation, but God's anger was moved at it as a degradation. We are shut up to one of these conclusions: either the pious sons of Adam married the daughters of Cain, the murderer; or, in some mysterious way, there was unholy communion by Angels—this latter interpretation, which some considered to be favoured by Jude 6, is universally given up.

The following has been asserted with some confidence—Cain, having done a dark deed, was not slain, but branded for preservation and execration. He went forth, married, and built a city. A city required men to build it, and his going forth to be a fugitive and vagabond among men who might kill him, seems to show that there were other people, and that from them he took a wife. If it were so, we answer—

> "The shrewd
> Contriver, who first sweated at the forge,
> And forced the blunt and yet unblooded steel
> To a keen edge, and made it bright for war,"

had not a pleasant pedigree in murderous father, and mother who was but little removed from the brute: but to reply soberly—Cain married a sister, as is admitted, of Seth. The building of a city would be of lowly beginning—of one hut, cottage, or house; great gaps in the Scripture record are acknowledged; and the children of Cain called the city by his name.

If any race, moreover, could be proved of brute ancestry, say the Negro, there would be an argument for slavery founded on natural and essential inferiority; for the fact of God making men of "one blood" does not prove that all mankind

is descended from one pair of ancestors; but may be taken to mean that there is one flesh of men, another flesh of beasts, another of fishes, and another of birds. (1 Cor. xv. 39.) This, however, cannot be proved, the argument falls to the ground when we consider the whole force of the statement, we are all the offspring of God. (Acts xvii. 26-28.) The unity of men is further evidenced by death and redemption,—"In Adam all die, in Christ all are made alive." (Rom. v. 12-14; 1 Cor. xv. 22, 49.) If there are other men than the Adamite, not having his image, they have not his redemption, nor any heavenly image. To say that the Mongol and Negro partake of redemption, just as four-footed beasts, and wild beasts, and creeping things were presented to Peter (Acts x. 11-15), is to misconceive the whole thing. The Mongol and Negro, if pre-Adamite, did not sin in Adam, are not of his race, nor possessors of the blessing of redemption.

We conclude, that the Adam of Scripture was the first man; and admitting, on Scriptural and scientific grounds, that the human frame is that structure which crowned the long process of organic life on the earth, firmly maintain that the first man, Adam, not only manifested a great and marked difference and improvement in structure, excelling all other creatures, but, in the essence of his nature, in personal consciousness, intellect, and emotion, excelled them in a degree that is immeasurable and practically infinite. That which so differenced him from the animal, which the science of physics cannot hope to detect, barely hope to conjecture, was a spirit uniting the fleshly organism and the rational animal life into an immortal personality.

In connection with this personality appeared an evil of most appalling character—Sin. Sin is a wilful violation of law; is an act or a course of conduct voluntarily pursued to the damage of physical or moral completeness of life. Law is disclosed in every throb of the mighty rhythmic life of the universe, law is implicated in every action of our life, obedience to it is our only guarantee of purity and happiness. Man, in pure personality, had God's love; and his own love to God, occupying will thought and feeling, determined the sanctity of his whole being. By entrance of sin that personality became impure, and

unity with God was dissolved; for evil will made Divine will appear loveless. We cannot fully understand this; there is some great secret reserved to be made known hereafter to holy men; but we know that the effect of lawlessness was to raise strife in the soul, so that the spirit and flesh became contrary (Gal. v. 7)—strife issuing in death of the spirit by separation from God.

We must not forget that death reigned in the world before Adam either lived or sinned. From the very earliest times our earth has been an arena of strife; hence we are led to think that evil originated in a preceding existence and amongst other beings. "The opening chapters of Genesis unquestionably set us down, not at the earliest but in a subsequent—the middle—stage of the mighty action, which it is the purpose of Scripture to unroll. Far away in the unfathomed depths of the earliest times, and pre-hexameral period, lies the beginning of the story; far onward in the future lies its consummation; indeed, in some sense, that is, if we regard the design and the result, the narrative stretches from one eternity to another."[1] This complexity and continuance—affecting body and soul, and contaminating with guilt—shroud Adam's death with mysterious horrors of woeful anticipation, and make it a death which had not previously existed—a death entering by sin. (Rom. v. 12.)

It is natural for us to wonder that even one wail of sorrow should mingle with the wide chorus of thanksgiving to God; and when we contemplate the past horrors desolating every land, and the possible future unimaginable eternal anguish to be endured by rebels against the Almighty, our amazement becomes an awful dread of some dire reality and calamity which even Infinite love, Divine wisdom and almightiness may not be able to prevent without violating the purity of moral government. We can conceive that Omniscience may have foreseen that the gift of freedom would render it impossible for the whole universe of spirits to be preserved. So far as man is concerned, we can also see that linking the inevitable danger with a type to show its reality and the unreasonable folly of transgression; and the giving a simple,

[1] "Science and Scripture:" Rev. Philip Freeman.

earnest warning, joined with dread penalty, would be the best and only restrictions which purely moral rule could allow. Our feeble nature moreover can form a true conception of Omnipotence in creation, of wisdom in Providence, of love in redemption. By Creation, God calls into existence all the worlds, —occupying them with manifold forms of beauty, and giving them for abodes to living creatures,—small as a point of matter, grand as a seraph before the Throne. By Providence the world of matter is subjected to the physical law of God, and the world of spirit or intelligence to the moral order of God, spreading the profusion of Divine bounty, and executing Divine decrees. By Redemption is supplied guidance for the erring, strength for the weak, moral suasion, motives, spirit-power, pardon for the sinner; that every fallen being who wills it may be rescued from degradation and elevated to life and honour. Thus, in some degree, we realise that freedom of the creature may involve the possibility and thereby an actuality of evil, which even the Supreme may not be able to prevent, except by departure from the principle of moral rule.

Evil is so intense, that sometimes we would that it be put an end to at once. We say,—"Let present misery and future anguish in no wise be permitted." We must not be rash in decision. The malignant influences, painfully felt by us, and our spiritual dangers, "as tenants of this haunted planet," we may be sure, tend to some good end. They are so wrought into the physical and moral plan of the universe that they cannot be regarded as a surprise on the Almighty, or as an unforeseen calamity. The mighty tempter of man, whom we believe to be a subtle, fallen archangel, manifested by that temptation, how great a degradation had come upon him by wickedness. That archangel chose evil for his good; the fact of choice proves freedom, brings in responsibility, and casts out necessity; even as freedom in its very essence includes power of choice, and thereby capacity to bring in evil. Man possesses powers of the same nature, but less in degree. If we set before us the essential contrast of light and darkness, of good and evil; that good becomes a higher good by trial, and evil a greater evil by refusal of good; that truth must be manifested as separate from a

lie, and righteousness must be displayed as opposed to unrighteousness; that through eternal ages the height and depth of truth and right may be seen; we shall begin to know that the mystery of iniquity is a necessary mystery: that a parenthesis of misery must, some time or other, be brought within the Divine rule. If you say,—"But for sin I might be happy as a glorious seraph, enjoy an overflow of blessing, and have deep insight of Divine goodness; and why should this good not be given, instead of having to be wrought out by the misery of millions?" We reply,—"The highest and best gift, to created beings is freedom; freedom involves choice, responsibility, and the possibility of transgression. Shall no free existences be created? nothing to love God? nothing able by choice to say, 'Lord, we are Thine and Thou art ours!' why, this would be sin's most awful triumph! fatal in the casting down of moral perfection and goodness! perverse in turning liberty, which is guided by motive and reason, into supremacy of blind and inevitable fate!" For God not to create because free beings must necessarily have power to abuse His bounty were folly indeed. "How can we conceive a more awful triumph of evil, than that its dark and hateful spectre, while yet unborn, should tie up the hands of the Almighty from the noblest exercise of His creative wisdom, and imprison His infinite riches of goodness within His own bosom; so that matter should never exist, because it might issue in a soulless and infinite chaos; and no reasonable souls ever spring to life, to love and adore their Creator, lest the dark power of evil should seize upon them, in spite of all His perfection, and drag them down into an abyss of ruin. To deny life to infinite numbers of holy and happy beings, whom His power could create and His wisdom govern, and in whom His goodness might delight itself for ever, through the fear of the victory of evil, in the abuse of His own gifts—what were this but for the Supremely Good to play the coward and the murderer, and thus to deny His own being, and renounce His Godhead, lest the abusers of His free bounty should suffer the just punishment of their crimes?"[1]

There may be mercy even in the condemnation. Punish-

[1] "Difficulties of Belief," pp. 66, 67: Professor Thomas Rawson Birks.

ment may be Divine medicine, the alone effectual, for sin of the soul. Every stroke of God, as a rectifier, may not only be against hatred and all evil, but much more for the enlargement of love wisdom and joy. We may be sure that the power of God has not gone beyond His wisdom, nor wisdom exceeded goodness.

Allowing that wisdom permits the entrance of evil, and forbids the exercise of physical power in its destruction—evil coming out of freedom granted to angels and men, evil is not an arbitrary thing on God's part; nor are we to think that Divine Omnipotence means the power to condense into a single moment the great results of the revealed plan of mercy. Granting that evil is a veiling to some, and a casting down to others, it is an unveiling to many more, and the disciplinary means of receiving power to ascend beyond the former height. Trials, which strand or sink some, are as those tempests on the sea, which purify the land and make mariners skilfully bold. Men are not victims to "the ruffian violence of an impure reprobate ethereal race." The poet may write—

"Video meliora proboque,
Deteriora sequor,"

and the saint exclaim, "the good that I would, I do not, but the evil which I would not, that I do;" nevertheless, God gives victory to the valiant, and the ruin of those that perish must be ascribed wholly to their own sin; not to the denial, on God's part, of grace. Moreover, who can tell what may happen "when their irremovable sorrow finds beneath it a still lower depth of Divine compassion, and the sinful creature, in its most forlorn estate, and in its utter shame, encounters the amazing vision of tender, condescending, and infinite love?"[1]

It may be seen from such reflections that sin, in the fact of provision against its existence, and provision for its destruction, drives out chance and fate from the world. The living God has ordered that we shall have the power of life in ourselves, and be free. We are free: not a man lives but knows that his freedom counts for something in the world. Even the physical struggle is not so much pitiless and embittered, as an adjustment of endless variety, and a display of power

[1] "Difficulties of Belief," p. 239: Professor Thomas Rawson Birks.

exercised with skill. Satan, circumstances, motives, may persuade, not compel. The body loaded with chains so that we move not; a seal on our lips, we speak not; yet, in our conscience, with every moral power, we resent the insult—not as by a new power of freedom, but by the gift that conveyed it of old to the first man. God, who made him free, foreseeing the peril of that freedom, not only made the peril conspicuous by type, by warning, by threat, excluding sin on the one side, and defining it on the other; but did also meet the inexcusable abuse of freedom by giving celestial machinery, spiritual power to work repentance, to effect a moral change, and convert ungodliness into a righteousness that leads up to fulness of peace and joy. Thus, the transgression of the first man, transmitted to us by natural inheritance, is made the ground of advance into higher spiritual life. The son dies not for the father's sin, but being warned and sowing to the spirit, reaps life everlasting. Sin, however, and here no mistake must be made, is always sin, and the wages of sin is death; yet if a man say, "I have erred, but mean to err no more," the door is opened to that man. God Himself helps, and comforts, and saves. Jesus has greater power for moral good than the great archangel possesses for evil. Salvation does more than run side by side with destruction. The second Adam outruns the old Adam to tell us that the malice of him who assailed our race, and the weakness of him who first betrayed our race, are but the small dark cloud that specks the infinite sky: that even now the tears of nature glow with a beautiful bow of promise of powers unrevealed, of wisdom unfathomed, of love inexhaustible, by whose beneficent influence the Adamite and pre-Adamite fault will be made to display the wisdom of universal Providence, and establish the government of a righteous King.

"Lord, grant me grace to cling to Thee,
In this presumptuous time,
When reason, by distorting, mars
Thy mysteries sublime,
When none will creep along the ground,
But all must soar or climb."

POOR MAN'S QUARTERLY REVIEW.

STUDY XVII.

MAN: ORIGIN, NATURE, LANGUAGE, CIVILISATION.

"I cannot but believe, that, if we would so regard the ills and sufferings of man as to endeavour to assuage them, we must deliver ourselves from notions, however plausible, and from theories no matter how clever, which reduce him to the level of the beasts that perish."—*Address in British Medical Association, Norwich*, 1874. *J. Russell Reynolds, M.D., F.R.S.*

THERE was an old superstition which saw in nature the action of capricious deities; there is a modern superstition which sees nothing but the action of invariable law; both being regardless, or ignorant, that everything done in nature manifests a knowing how to do it.

Ancient seers ascribed even the gentlest, most constant, as also the mightiest works of nature, to the operation of God. "The Lord by wisdom hath founded the earth; by understanding hath He established the heavens. By His knowledge the depths are broken up, and the clouds drop down the dew" (Prov. iii. 19, 20). "God created man in His own image, in the image of God created He him, male and female created He them" (Gen. i. 27). We do not, nor did the wise ancients, think that a likeness was moulded in plastic clay of the spiritual and invisible God. Ancient and modern thought regards the words and act as symbols expressive of some special operation in the creation of man, and of his separateness from all other creatures. We have been curiously fashioned by natural forces into animal life; and by mysterious influence, of external operation and interior assimilation, enabled to bridge the gulf which separated earth-life from consciousness of Divinity.

There is something very tender in the words—"God breathed into man's nostrils the breath of life." They endue the ideal image with vitality, and awake it into consciousness by a kiss of love. They are the poetic simile of a Divine process, a

loving symbol of Divine action, a contrast of God and man, spirit and flesh, soul and body, the summing up, the head, τέλος, of all things. The fact may sustain the superstructure of various thoughts.

Our never being able of ourselves to *originate* any form of mental activity; no one ever acquiring the creative power of genius, or *making himself* a great artist, or a great poet, or *gaining by practice* that peculiar insight which characterises the original discoverer; shows that these are mental instincts or spiritual intuitions.[1] What we can do is—call upon our will by "*purposive selection*," by *attention*, by *direction*, to train, utilise, and perfect natural gifts: therefore, spirit is placed within the body, and subjected to the internal mechanism of thought and feeling.

Thus separated psychically from the brutes, we are enabled to pass from the Fiji, who delights in the shrieks of his human victim, to that higher kind of self-pleasing which leads a man to risk his life in rescuing even an enemy from drowning. This action of sympathy and love is not selfish, though sacredly self-pleasing, any more than the workings of Shakespear's genius are reflex actions of that, whatever it be, which forms the ground-work of canine cleverness. Not only so, as human emotion and intellect have their seeds in the past, indeed are partly animal, partly human, running down into the earth out of which we were taken, and soaring toward Heaven whither we hope to ascend; there is reason to think that our powers not beginning with the present conscious existence will not end with it. Every man's consciousness, both for good and evil, not being the product of one body, but an effect wrought by human progress during the past—the deduction is that our end, whether as to soul or body, is not by and by. The leaves of our life-book contain writings of past ages, the present issue, or edition, does not complete the series; there will be a quickening again of intelligence, and an extension of memory, by a mysteriously regulated advance, and higher correspondence with the Eternal Spirit of the universe. Memory will be plenary, no longer

[1] "Mental Physiology," p. 25: Dr. W. B. Carpenter.

a place of sepulture for the remains of many generations, but possess the power of endless life (1 Cor. xiii. 12).

This "*Plenary Memory*"[1] will lead to higher processes of life; the measure of which will be our capability and fitness. Unclouded by fumes of laboratories, untainted by sensual appetite, unhindered by life's ills and weaknesses, we may presume that we shall not travel by the present methods of logical reasoning, but be nourished and built up in truth by a sort of mental assimilation. The process being somewhat akin to the present work of the Holy Ghost (Jno. xvi. 13). The soul, combining with itself every element of knowledge, ever moving on, not wasting organic force, will be built up into the power of knowing more and more. The spiritual faculty, discerning all the links of the great chain which binds diversity of operation into unity of wisdom, will gather every luxury of love and knowledge.

Thus accepting "Development" as a fact, we hold that "Adam is the princeps, and so the ideal prius of the creaturely world."[2] Using the idea of "Natural Selection," so far as it conceives an intelligent work in the world, the conversion of the lower into the higher by heredity, adaptation, variation, and distribution; we maintain that man is something more than a material organism. His structure, wonderful as it is, does not even approximately represent his essential nature. With a certain difference in structure, between the lower apes and the gorilla, we find a moderate and measurable difference of nature; but, with a less marked difference of structure between the gorilla and man, we have an immeasurable and practically infinite divergence of nature.[3] His chamber of consciousness is the meeting-place of the material and the spiritual, he forms antithetical conceptions of both, correlates their energies, and in part understands the meaning of the wonderful machinery of which he is a portion.

Man, as the highest animal, is an actual microcosm, and represents the whole of life in the world. Represents it as being of the earth, and taken from the ground; yet excels it

[1] "The Physical Theory of Another Life," p. 79. Isaac Taylor.
[2] "Lange on Genesis," p. 211. English Translation.
[3] "Evidence as to Man's Place in Nature," p. 103. Professor Huxley.

not only by possession of superior mechanism ; but, in use of mental and moral faculties. Considering his mechanism, we find that the organism in many respects nearest to him, the Anthropoid Ape, the Gibbon in particular rather than the Gorilla, is not a diminution of that which would otherwise have become human ; but a formation by lateral and diverging operation which, however long continued, could never arrive at man. "The two series, ape and man, diverge from one another . . . the youthful individuals are more alike than the older ones . . . the ape, as he grows, becomes more bestial ; man more human."[1]

Those moral and spiritual powers, summed up in one word, "Soul," cannot be explained by the material properties of protoplasm, nor find an equivalent in mechanical adjustment ; nor is the soul made up of psychical bits which have passed through the life and mind of lower animals. The dog possesses attention, abstraction, imagination, judgment, desire, grief—indeed a share of all the intellectual faculties and passion ; "the dog, the cat, and the parrot, return love for our love, and hatred for our hatred ; they are capable of shame and sorrow, and, though they may have no logic nor conscious ratiocination, no one who has watched their ways can doubt that they possess that power of rational cerebration which evolves reasonable acts from the premises furnished by the senses—a process which takes fully as large a share as conscious reason in human activity ;"[2] but the soul is very much more than this. When we can conceive the nature of matter apart from its properties, then we may begin to investigate the nature of the soul ; at present we have neither power to understand it nor words to describe it. The withering conclusions of atheists as to the mortality of the soul are unwarrantable and unscientific ; for if matter cannot be annihilated, it appears highly unscientific to assert that the spirit in man, which subdues and rules matter, is of less enduring nature. Moreover, the principle of the conservation of energy is antagonistic to the utter loss of such mental energy as is lasting in its results on our present life ; the

[1] "Doctrine of Descent and Darwinism :" Professor Schmidt.
[2] "Antiquity of Man," p. 495 : Sir Chas. Lyell.

cause of these effects cannot be annihilated, though it may change. We must pity that flippancy which contemns this high spiritual gift; and pray not only for the unwise who would refuse, but for the rash who despise the glorious distinction. It is a mystery, and the small vessel of our human reason, able to receive it as a gift, is utterly unable to comprehend its nature.

> "It cometh from afar—
> Not in entire forgetfulness,
> And not in utter nakedness,
> But trailing clouds of glory do we come
> From God, who is our Home."

We are rudely aroused from our joy in this perpetual benediction of Heaven, and degraded to bestial fellowship. We are as some scion of a noble house suddenly told, "You are not of honourable birth, you lie down with a dog-twist, your laugh is taken from the hyena, your song from the mocking-bird, your tears from the crocodile, and your speech from the rudiments of animal cries. You are not a child of God, morally and intellectually endowed, you crawled into existence through many brutal shapes—"

> "Quum prorepserunt primis animalia terris."
>
> HOR. : *Sat.* i. 3. 99.

"When men first crept out of the earth, a dumb and filthy herd, they fought for acorns and lurking places with their nails and fists; and, then, with clubs; and, at last, with arms which taught by experience they had forged. Then they invented names for things, and words to express their thoughts, after which they began to desist from war, and to fortify cities and to enact laws."

We will not multiply classical quotations; our concern is rather with those of our own day who state, "men, originally brutes, attained nobleness of mind. Before and during the transition they were not men, but creatures without the spiritual part of our being; nor endowed with the awful attribute of immortality." It may be put more definitely—there was a common point from which the present apes and men were derived. No greater difference exists between a man and a brute, than between one brute and another brute. Some animals are

very upright, and some men are very hairy. "The soul of a new born infant is, in its manifestations, in no way different from that of the young animal."[1] Negroes and Indians are a low sort of men, but not so low as the Australian and Papuan; all these have not got on, and are left behind the average individuals of our race. Hence the fear of Mephistopheles lest men should be alarmed at finding themselves too much like God, is now changed into the dread of being too much like sheep. The course of transformations, we are gravely assured, was along the vertebral column; indeed we have only to look at the first vertebra of a sheep's neck and the last tail bone to see our identity established, and the gradual transition exemplified; we are all sheep with antelope-like ancestors. The ape struck out a disastrous path, persisting in a brain of small volume; but man selected a high conformation of well-formed and plastic cranium. Young monkeys and calves are still like us, they have not the bony skull and horns which are afterwards developed.

One rather likes the humour; clever men are evidently making fun for us. The monkey has been given up, and now we are all sheep of an improved breed. The change is rather too sudden; and if it is hard to see how from the monkey's foot, which has extra muscles, rendering it a foot-hand for climbing and grasping, could have been evolved the flat-treading and walking human foot; it is yet harder to have got it from anything which became a sheep's trotter.

As to reason, we are told man cannot be widely separated from his lower creatures: for little children do not manifest great intelligence. Human progress is regulated by speech; and dogs talk, and are confessedly more civilised and intelligent than the wolf and stupid jackal. "Who can question that they have raised themselves mentally far above their ancestry?" Who can "doubt that the honey bee, as it gradually attained bodily advantages and peculiarities, developed likewise the higher mental powers, corresponding with the more minute and complex organism of the brain?" Even tame seals come like dogs at the call of their keeper.

"As to man's free will, little," we are told, "can be said for

[1] "The Doctrine of Descent," Prof. Schmidt.

that; the individual mostly acts upon the will of the tribe—I might say of the herd." "The astonishing premeditation with which some few happily organised individuals, of some few species, turn circumstances to account with apparently complete free will," disposes of our conceit as to human freedom. As to conscience, there are some very conscientious dogs; and some animals dream. "That highly interesting dwarf people, the Niam Niam of Central Africa, have no word for God, and therefore, it must be supposed not the idea." As to progress in art, science, agriculture and architecture: the tactual sense, common to every creature, is mother of it all. With regard to languages, they have been developed. When there were races and no nations, man was a speechless animal. All languages have progressed: first the root, then the stem, after that a determinative element. In the root state, articulate sounds grew into words; in the stem stage, the words stuck together, and formed the agglutenated languages; finally the whole stood complete with inflexions in the speech of many nations.

We are to conclude that, "from the irrational primordial state, man-like beings gradually became human; while with language, the work of many years, reason made its appearance." Some would complete this sketch of ourselves by imagining a miserable ape, crossed in love, or pining with cold, conceiving in its poor addled pate, "the dread of evil to come:" so he became the father of morality and theology, the very patriarch of the old worthies. "Fortunately for mankind, no actual legislators have ever been quite so foolish as some philosophers."[1]

"Dieu me garde d'être savant
D'une science si profonde.
Les plus doctes, le plus souvent,
Sont les plus sottes gens du monde."

There are three centres around which the Animal-Theory Arguments cluster:

i. Man was originally a brute.
ii. Human Language was developed from animal cries.
iii. The Process of Development was by Civilisation.

[1] "The Reign of Law," Duke of Argyle.

i. Man was originally a Brute.

For a long time we counted ourselves of ancient and honourable family; but now, because the beaver builds, architects are beavers; the ladies who sing in our drawing-rooms have been taught by the birds, and their sighing swains are descendants of grotesque creatures anciently crossed in love; probably the Australian and Papuan are the stuff of which future men must be built; even as the present originated from those yet lower. These statements, which shock our best feelings, are so far true that some people have an uneasy feeling that scientific discovery is at war with religious convictions, and is removing primæval inspiration from the circle of facts. A brief, yet sufficiently accurate inquiry as to the whole subject, will probably dissipate that fear.

We know from the Divine Narrative, as to the creation of man, of other animals, and of plants, by means of the Earth, that all present life is descended from ancient forms. We also know that all the forms of life, animal and plant, complex or simple, high or low, are a marvellous variation, adaptation and extension of one scheme, plan, or formula of universal comprehension. This fact, obtained by comparison of the whole, is confirmed by particular examination of every individual: nevertheless, anatomy of the embryonic vesicle in higher plants and of ova in animals reveals a difference. The unicellular plants and animals are from small masses of protoplasm, and probably each has a nucleus—extreme simplicity is found only in the lowest forms. The germs proceed from pre-existent living creatures; every germ so alike that the microscope detects little difference; every germ so essentially unlike that one becomes a fungus, another a lizard, another a bird, another a man, no one knowing why; but there is no advance into man through the fungus, lizard, bird, as if human life were a series of Chinese boxes, completely but differently shaped in every feature, shut up one within another; though man's embryo does advance to perfection through invertebrate, reptile, bird, and mammal stages.

Seeing that existing men are thus proved to be human offspring, the argument is now to be carried into a region altogether beyond human ken; and forgetting the fact that all

living things proceed from other living things, we are to find whether the ranks of the living may be recruited from the not living. All existing organisms, it is inductively proved, arise from other organisms; but there was a time when life must have begun in an assemblage of unorganised materials. That an organism which is to any extent specialised in structure could arise directly from an union of unorganised elements is ruled out of court. We are to think as if we saw, by chemical experiment, specks of living protoplasm precipitated from a solution containing the not-living ingredients of protoplasm; and we may regard this initial life as the effect, of which the assignable cause is the chemical affinity exerted between the enormously complex molecules which go to make up the protoplasm. This process helps us to imagine how nature long ago, by Divine appointment, gave to life its beginning; or, speaking more freely, gave beginning to life. Then, we further suppose, that from those specks proceeded the first or unancestral organisms; and that these unancestral organisms did, in some way or other, transmit ancestral peculiarities; so that out of no definite tendency came definite structure exquisitely adapted to function. The origin of protoplasm, thus guessed at, the association of vital properties with protoplasm remains unsolved, and organic construction is still an insoluble mystery.

The man of science thus trying to show how life may have originated, contents in some degree the curiosity of the religious man who knows, from Scripture, why life was originated. The supposed initial germ is multiplied and magnified, into the manifold series and gradations of terrestrial existence; and the whole process is exemplified and accomplished in every case of individual progression.

To account for the maintenance of life during the infancy of primeval existences; to be rid of the difficulty as to untold millions of organic molecules all rushing together at some appointed instant to form adult organisms; and to show that no new energies have appeared at any period of the earth's history; the doctrine of evolution affirms that the quick progression in the individual was not realised until one, somewhat analogous, had been accomplished in and during the evolution

of a long series of individuals, from lower life to the brute, and from brute to man. In the brute the process was chiefly by physical changes; but, so soon as sufficient intelligence was acquired to chip a stone into a tool and hurl a weapon, growth of intelligence being of more use than variations in physical structure, intellectual and emotional powers developed with greater comparative rapidity. This was the all essential crisis and step in psychical progress, and explains why there is so little difference in general physical structure between man and the gibbon.

Testing such a statement by common experience, and throwing the light of Scripture on it, there is no more ground for supposing that man grew out of brute in old time than that he does now. The definite order and progress in creation by which not living matter became that vital substance, with which a mysterious power—for life precedes organism, not organism life—constructed all living things and bound them together; not making porcupine father to pig, nor monkey parent of man; but presenting in every one an exemplification of similarity in construction with essential variety; in nowise weakens but confirms the teaching of Scripture; "out of the ground made the Lord God to grow every tree. . . . . God made the beast of the earth after his kind . . . . and the Lord God formed man out of the dust of the ground."

Further, there appears to be no essential advantage in the gratuitous assumption of an infinite series of developments during incalculable time; seeing that a real development is exemplified and completed in the course of one individual's existence. There has also been the introduction of new energies; assuredly there was something fresh in the first form of vegetable life; for there is no possible conceivable combination of inorganic energies that are equivalent to the actions of a living animal organism; life has no physical correlative.

Passing from the phenomena of life to those of mind, the region is still more profoundly mysterious; and, whether as to consciousness or volition, we have absolutely no reason, however vague, for classifying them under the head of physics. Physical energies represent a closed curve or cycle continually

returning upon itself; the introduction of organic energy carries the line into infinitude, and the curve is as incapable of closure as a parabolic projection. It is also to be observed, as to physical energies, that some are of higher order than others; and from the higher we can obtain the lower; but the reverse is attended by extraordinary difficulties—

> . . . "facilis descensus Averno;
> noctes atque dies patet atri janua Ditis:
> sed revocare gradum, superasque evadere ad auras,
> hoc opus, hic labor . . ."

It is, therefore, unwise and unscientific to endue all matter with the mysteries, qualities, and occult powers of mind; and we may count it an evidence of incapacity and scientific impurity to endow the physical atom with "the promise and potency of all terrestrial life." Nor are those less blamable who, knowing that the sacred account is figurative, use their science not for explanation but misrepresentation. Take example—"The Hebrew writer presents us with a concrete picture of the creation of man, according to which a homogeneous clay model of the human form is, in some inconceivable way, at once transmuted into the wonderfully heterogeneous combination of organs and tissues, with all their definite and highly specialized aptitudes, of which actually living man is made up. But I suppose there are few scientific writers at the present day who would be found willing to risk their reputation for common-sense by attempting to defend such a conception."[1] It is really puerile to charge Moses with the folly of the Negro, who thought that God made a clay model, leaned it against a tree to dry, and then breathed life into it. Why not say that Moses attributed sex to God? for he says —"God created man in his own image, in the image of God created he him, male and female created he them." Irreligious persons generally charge their own shallow and erroneous views of Scripture on the sacred writers; but advanced scholars who, with piety and prudence, ascertain all that can be ascertained of the way in which man was created, are conscious that scientific interpretation of the ancient words reveals divinity of meaning.

[1] "Cosmic Philosophy," vol. i. p. 440: John Fiske.

Our reverence for Scripture, and our own self-respect, lead to the belief that low races of men, ancient and modern, are the withered foliage of a degenerate stock. Inclemency of climate, barrenness of land, which made existence an exhaustive and losing fight, may have worn out the frame, left neither time nor will for intellectual advance, and rendered the brain of a savage what it is—nearly thirty per cent. less than the brain of an Anglo-Saxon. It is not generally known, that Negro babes, and especially Malay infants, are born white; they assume a dark hue after ten days. Dark nations count the white skin superior, and destined to rule. The legends of some savages assert that their ancestors were white people; and the Fetish images of the Congo natives have broad foreheads, white complexion, and hooked noses. Degeneracy lowers both the moral and physical state; as a rule, the worst men are of the worst colour. Malte Brun says—"Our body depends on our intelligence." M. Maire says—"The more the organization of the animal is perfected, the more the spiritual element produced by the action of the various functions is itself perfected." If we take history and experience, apart from sheer hypothesis, it is more probable that brute men are not a generation advancing to higher life, but a degeneration from life.

The marvellously gifted Attic race were the cleverest and most beautiful of men; but, becoming impure, they degenerated. In fact, the corruption of one generation suffices to effect a degeneracy which ends in moral death—mental death —material death. This accounts for the low intelligence of persons long addicted to immorality, the almost impossibility —when anyone has put away thought, love, and knowledge of God—of quickening sacred reverence in him. The vicious and godless, becoming spiritless and sensual, cease to have a true conception of Divinity. They are the violent, criminal, dangerous classes in our cities; amongst whom the shrewd, sharp demagogue is supreme; and to whom the atheist, with the arrogance of a god, asserts—"There is nothing better or greater than myself." To them belong the roughs who inhumanly abuse defenceless women; and from them proceed the hopeless and helpless weaklings who are born paupers,

are bred paupers, and die paupers. The greatness of degeneracy receives horrible illustration by this fact—"The difference in weight of brain between the highest and lowest men is far greater, both relatively and absolutely, than that between the lowest man and the highest ape."[1] It is another fact, that savage men, so far from growing up into higher intelligence by means of continual effort to increase their brain power, actually possess about one-third more brain-power than they use. Their mental property is an inheritance larger than they occupy, and not an acquisition laboriously gained in the past, and so fully used in the present as to win enlargement in the future.

To credit low forms of humanity with being the fathers of all that is great and good, ignores the fact that there is "hardly a single point of excellence belonging to the human character, which is not decidedly repugnant to the untutored feelings of human nature." Courage, cleanliness, disinterestedness, self-control, truthfulness, and justice, are all a conquest over some natural impulse. Henry More says—"Of a truth, vile epicurianism and sensuality will make the soul of man so degenerate and blind, that he will not only be content to slide into brutish immorality, but please himself in this very opinion that he is a real brute already, an ape, satyr, or baboon; and that the best of men are no better, save that the civilizing of them and industrious education have made them appear in a more refined shape. . . . . But as many as are thus sottish, let them enjoy their own wildness and ignorance; it is sufficient for a good man that he is conscious unto himself, better bred and born."[2]

Even thosewho are better born and bred know that it is easier to lose than increase the good. In the Australian bush, and in the backwoods of America, individuals of the Anglo-Saxon race, possessing the highest feelings and noblest instincts, rapidly fall into comparative barbarism. No Australian language counts beyond four — are Australians the future mathematicians? Some wild tribes live together in herds, do not know the use of fire, every attempt to introduce civilization

[1] "Man's Place in Nature:" Prof. Huxley.
[2] "Conjectura Cabbalistica:" A.D. 1662, p. 175.

has failed, it rather accelerates their destruction. The Austrian missionary, Morlang, who long laboured among the negro tribes on the Upper Nile, says—"Any mission to such savages is absolutely useless . . . these brutal natives are utterly incapable of any feeling of gratitude." He must be hopeful indeed who can believe that this is a generation tending to life. No teacher, no system of culture, has ever raised an ignoble race to the fore-front of human progress. The problem of elevation will not be worked out by bringing men down to mere animal culture. There are no facts on which to base a theory of humanity grounded on brutality planting a paradise.

Another argument has been lately put forth—"The sense of original sin would show, according to my theory, not that man has fallen from a high state, but that he was rising in moral culture with more rapidity than the nature of his race could follow."[1] The theory is rather marvellous: we have been growing and growing, for millions and millions of years, very, very slowly, and yet we have grown too fast—have out-grown our clothes. After all, we are a new race; and translated into new conditions, our nature and instinct fail us; new men, made rich, we know not how to behave. Very few will accept the theory that we are too good already, and are rising in moral culture with more rapidity than our nature can follow. The Chinaman has for thousands of years been under "a system of examination notoriously strict and far reaching; boys of promise are passed on from step to step until they have reached the highest level of which they are capable."[2] "Chuan Yuan, the senior classic and senior wrangler thrown into one,"[3] the best man out of four hundred millions, is so finished and polished that he remains for ever unruffled by any emotion or conviction that anything he does is immoral or wrong. He ought long ago to have outgrown his clothing, but he has not the least sense of having gone too far for the nature of his race, or too rapidly grown in purity. The conscience of a poor negro is much more readily aroused than the conscience of a Chuan Yuan.

[1] Galton's "Hereditary Genius." [2] Galton's "Hereditary Genius."
[3] Galton's "Hereditary Genius."

The statement—"History is not wide enough, nor any recorded time sufficient, to take in the ages during which brute-man grew into human-man," surrenders the argument as to quick growth. There is truth in Schiller's words—"Es wachst der Mensch mit seinen grössern zwecken," man grows as grow his greater aims; but, going back to the utmost limit of geological eras, there is no evidence that any inferior animal grew into a superior animal, or one creature into another creature, or that the nature of any surpassed itself. During the historic thousands of years no creature regenerated itself, nor took one step thitherward; are we to believe, against all experience, in asserted transformations during times beyond our experience? Ancient seeds, found in Egypt and Switzerland; the frescoed likeness on ancient walls of olden animals; are of precisely the same form and size as those now existing. There are changes, doubtless, but narrowly limited; and if the laws of nature are unchangeable, no time, however extended, would change them, or suffice to make plant become animal, or brute grow into man.

ii. It is asserted that Human Language was developed from Animal Cries.

The improbability is felt at once; nevertheless, a fact of great value may be gathered from the assertion. All the sounds produced by animals and birds, all notes evoked by the wind, the mysterious noises of the forest, the strains of musical instruments, have their representatives in the human voice. No wonder, therefore, that some resemblance to human language should be found in utterances of the beast; yet those utterances were no more the guiding principle in the formation of language, than the perpetually rolling ocean, in its motion rhythmically repeated, can be said to have taught the human artist, in the outflow of his own emotion—now gently gliding, now gracefully leaping, now violently stirred—to pour forth a stream of sound which brings to our mind mysterious moods, and lifts up our soul to the regions of everlasting harmony and repose.

William Humboldt said, "Man is man only by means of speech, but in order to invent speech he must be already man . . . According to my fullest conviction language must

be regarded as naturally inherent in man, for it is altogether inexplicable as a work of his understanding in its simple consciousness . . . There could be no invention of language, unless its type already existed in the human understanding." Co-ordination of many groups of muscles is necessary for speech, and the nervous arrangement of the brain is *en rapport* with the complexity of the function. Idiots never speak well, yet it is as natural for man to speak as for bears and birds to brum and twitter; whereas the large air sacs of the gorilla, and most anthropoid apes, are incompatible with speech. There is no trace in man of these remarkable structures.[1]

It is impossible to trace up all words to imitative and exclamatory sounds: for we frequently come upon roots of fixed form and general meaning which are unexplainable in themselves; and, as to explaining the existence of these roots, science stands helpless. There is no record, nor reliable tradition, that any race invented a language.

Languages do not appear to enlarge their capital, they mingle and change as men themselves do; but their path, amongst all modern nations, is rather to directness and simplicity than to maintain and complicate the old elaborate texture. It is certain that all modern speech has been derived from ancient, the cognate roots strike into a depth of common structure, and the educated man of to-day uses substantially the method of the savage—only expanded and improved in the working out of details. So that all languages represent mainly the same intellectual art, no new central principles are discovered; changes being wrought by addition and improvement in detail; even the American languages seem rather the work of philosophers than savages. It is impossible to believe that the highly complicate and accurate ancient tongues, Sanscrit, Greek, Latin, were the workmanship of creatures not far removed from the brute. There seems to be language because there is reason; and but for language reason would speedily be degraded.

It was asserted by travellers, when language was seen to be the frontier line between man and beast, that human beings existed without religious ideas and without language. We

[1] "Natural History," see Gorilla: P. M. Duncan, M.D.

were told, again and again, that the Veddahs in Ceylon have no language. Sir Emerson Tennant wrote, "they mutually make themselves understood by signs, grimaces, and gutteral sounds, which have little resemblance to definite words and language in general." In reply to this, Professor Max Muller[1] states, more than half of the words used by the Veddahs are, like Singhalese itself, mere corruptions of Sanskrit; their very name is the Sanskrit word for hunter, veddâh, or as Mr. Childers supposes, vyâdha. If they now stand low in the scale of humanity they once stood higher; they may possibly prove, in language if not in blood, the distant cousins of Plato, and Newton, and Goethe.

The dwarf Negrito race, an early if not primitive type of humanity, as we are assured by Professor Owen, like those of some prehistoric races in Europe, have "a quadrumanus unconsciousness of nakedness," yet possess a language. Language seems a necessity of our race, and the direct consequences of intuition changing into idea[2]; the capital act of language is the wish to speak.[3]

Low orders of men have poor languages, and little or no distinct sense of large numbers; some, as the natives of Kamchatka, possess numerals, say to 100, but can only count to twenty by means of fingers and toes. Will it be said of these low orders they are the latest evolutions from animals; their language is the most akin to brutal voice; and an invention, growing with the growth of their culture, from low to high degree? We think not. What we actually find is, "From the highest to the lowest, all men speak; all are able to interchange such thoughts as they have. Language, then, appears clearly 'natural' to man; such are his endowments, such his circumstances, such his history—one or all of these—that it is his invariable possession[4]—given to him for purpose of speech—as hands are bestowed for labour, a means of communicating and receiving thought.

Language places a vast and deep interval, incapable of

[1] "Address." International Congress of Orientalists, 1874.
[2] "De l'Origine du Langage:" M. Renan.
[3] "Discours de la Connaisance des Bêtes:" Father Pardies.
[4] "Life and Growth of Language," p. 2: Wm. Dwight Whitney.

being crossed by the lower animals; and eternally separating their nature and power from our own; and he is a coward who, fearing for his supremacy, or from want of faith in Scripture, would forbid scientific investigation. The essential capacities and tendencies of man led him universally and inevitably to speech: worked out a foreseen and intended result. He has not risen from a brute-condition by the product of speech; for he could never have produced language had he not been endued, at the outset with those powers, both of body and mind, which constitute man. He was mainly what he is now when the first beginnings of speech came forth; as lion was lion when he began to roar.

Wilhelm von Humboldt says language is an "organism," and "man does not so much form language, as discern with a kind of joyous wonder its developments coming forth of themselves." It accords with this, that philology refers the original forms of language to the primitive stage of the ancient human race. All men speak, their power of brain and capacity of thought are enlarged by speech, but no such differences are wrought as those which separate one animal species from another: all men, however differently they speak, are of one species. "Linguistic principles are actually worked out with as much originality, and more extensively if not more profitably, among savages than among cultured men.[1]" Examples are found in the Algonquin system of compounding words, and in the Esquimaux a scheme of grammatical inflexion. Metaphor and syntax also belong to the infancy of human expression. Indeed, language, in many respects, is by a sort of rough and ready ingenuity having more to do with the rule of thumb, Mr. Tylor says, than "with systematic arrangement and scientific classification." The "old barbaric engine" is better, more precise, comprehensive, and beautiful in many of the ancient tongues, than in any or all of the patched and tinkered modern speech. This accords with the Divine account concerning the beginning of human existence; but we prefer just now, to treat language as the product of art, a contrivance; and to regard human thought and conduct generally as organic and working under fixed laws.

[1] "Primitive Culture," Vol. i. p. 216: Edward B. Tylor.

If language is the product of thought in union with capable organism, and used as an instrument for imparting and receiving thought, it is due to the power of intelligence adapting means to ends. This is a highly complicate and intricate capacity. The psychic energies underlying the faculty and exercise of speech, bringing it to conscious exercise—themselves trained and developed by it, belong to those fundamental principles of religion, art and science, which make man what he is. Inner consciousness is by it externalised for ourselves and others, as the revelation and interpretation of the acts of the soul. For this purpose common sounds were imitated; self-expressive or emotional tones were uttered with varying emphasis force and speed; gestures were used, and motions of the features. This being possible by the possession of those various faculties and capacities which led inevitably to the production of speech. So far, therefore, we may say, no man is born a speaker, an artist, or an engineer; a lone man would not speak, and every child learns the language in which he talks; but the child, the lone man, engineer, artist, speaker, are born with the enabling faculties.

Carry the investigation somewhat further.

Every division of the human race has been long enough in existence to form its speech-capacity into language. Should we, if a new race came into being, by whatever means, find it gifted with speech? Or would speech have to be wrought out in the manner work-tools are invented and inproved? In one or the other of these ways must language have come. How is it with the lower animals? Not one of them originates civilisation, or culture—whether linguistic or artistic. Their utmost capacity only enabling them to receive training by a higher race, in activities, which they, themselves, have no power to evoke; and the imitative gesture, or grimace, or tone, is never human; but parrot-like. Inward power fails, whatever the outward occasion; but man possesses inward power and outward opportunity.

A lone man, science says—"would not speak, nor initiate culture"—we do not admit either as more than hypothesis; but are certain that man would seek his like, and find

woman. This would be by cogitation of the individual, involving self-knowledge or personality; then by consciousness of other and separate existences; then by desire seeking for another ego. This process of instruction and education is visible behind the veil of Scripture words. The impelling energy leading man from solitude, where he might possibly have remained speechless as the lower animals, to pour himself forth in human intercourse and in Divine communion. It is easy to imagine how Adam's language grew out of the spiritual ground of his heart. Thoughts and emotions being rooted then, as now, in the spirit; planted there by manifold sensations, quickening in distinct and branching into vivid perceptions; bloomed and ripened into the flowers and fruits of words. Thus we have the basis of speech, in the powers of man; the impelling cause, in the soul of man; leading to consciousness of himself and of others; and the necessity for speech, in the various wants of human nature.

We are told—"That is no acceptable explanation to a scientific man which calls for a special force at the beginning, to act like a *deus ex machina*, and then retire to act no more." Keep the marvellous out of view, then, altogether, and say—"Man began as a learner, and continued a learner;" but before the training and shaping process, a mental equipment, however small, was necessary; those animals which are nearest to man in structural arrangement do not speak; only creatures, such as parrots, in whose vocal organs it is not easy to trace the cause of the power. For a man to see as if trees are walking, there must be a little vision; and the apparatus of speech would be of no use unless, in connection with consciousness, were a definite reach and power of reflection to grasp handle and shape, in the different departments of mental action, signs of conceptions and their relations. In fact, the active and creative force of language resided in man as a marked and distinctive characteristic; and, thus possessing the physical and mental instrumentality, the need of expression produced speech.

It is not needful to adopt any theory as to the consonantal triple roots and internal inflexion of the Semitic speech

or as to monosyllabic roots; nor to decide whether the first words were nouns or verbs; nor yet to account for the fact that clever people, like the Chinese, have a language which, in many respects, is structurally the lowest, and in resource the poorest; nor is any dogmatic statement warranted either as to unity or separateness at the beginning. Science inclines to take "formless roots" as the origin of all language, but what those roots precisely were can hardly be traced out. It may fairly be thought, that as a calf will run about and help itself even on the day of birth; so man, having the organs of speech, when the opportunity came would use them; application and development necessarily must follow; not with words as parts of speech, to be put together in sentences, for no man, though capable as Homer and Demosthenes, can speak any language until he has learned it; but possibly with comprehensive utterances, one word conveying a whole statement. Demonstration, one way or other, is impossible.

Take words to pieces, or put them together; compare modern with ancient, and rich languages with poor; yet neither philologically nor historically is there any warrant for saying that former men worked on any other linguistic base than that now used. This is the more interesting, because there is not in any known language a word which can be said to exist, φύσει, by nature. The cry of animals is instinctive, but human speech is conventional; and every word stands in its accepted use, θέσει, by an act of attribution, determined by men's circumstances, habits, and references.[1] It is impossible to trace language even to human natural cries, brutal are out of the question; and no uttered sound, nor any combination of articulations come or came into existence as the natural sign of an intellectual conception.[2] We may as hopefully look to the beasts for our language, as for the particular and definite beginnings of the arts which develop our clothes, our instruments, our buildings.[3] The voice has been given to us for speech, but only as the hands are given to write with; and it

[1] "Life and Growth of Language," p. 282: Prof. Wm. Dwight Whitney.
[2] "Life and Growth of Language," p. 288: Prof. Wm. Dwight Whitney.
[3] "Life and Growth of Language," p. 289: Prof. Wm. Dwight Whitney.

is simply because they are most effective for speech and written word that they are the universal agents.

We may trace many languages to one parent language; take the sentences, words, and letters to pieces, dissolve them by crucial analysis into primitive forms, natural sounds, and voluntary expressions; but what of that? Man, to be sure, is an imitative animal, but not instinctively, nor in a mechanical way; he imitates because he has the capacity, just as he is an artist; the latter being only a higher development of the former. Take a mechanism to pieces; separate the brass, the iron, the wood, the leather, fuse and burn them; but, apart from the human intelligence adapting and constructing the materials, they are not the equivalent, nor explanation of the machine. What avails it that animals make noises which man fashions into speech; or that birds have notes which men attune to song; or that in the woods and on the sea are heard those rustlings, breathings, roarings, which men combine in orchestral harmonies? Man is naturally that intelligent creature whose material frame and inward spirit, possessing many and various faculties and capacities led inevitably to the production of speech, and to elaborate language. These capacities and tendencies universally and inevitably worked out the Creator's foreseen and intended result, language becoming, in an especial manner, the incorporation of the acts of the soul; a living breathing revelation of man to man, and of man to God.

"Comparative Philology has now succeeded in assigning the dialects of mankind, with more or less precision, to three families of speech; the Turanian, the Semitic, and Aryan."[1] The ancient languages are the most scientific, complex, and perfect in their structure; therefore, it is argued—"the forms and laws of structure, involved in the most perfect condition of language, were endowments of primeval man."[2] Knowledge grew, the seeds of thought were planted, the experiences of individuals and of races became registered, the intelligence stored up in the brain obtained further expression in writing. Revelation was made

[1] Prof. Max Müller.

[2] "Prehistoric Man," Dan. Wilson, LL.D.

permanent, and Divine Truth was written in the Sacred Book. So soon as spiritual efficacy began language had birth. In the very threshold of self-consciousness, when the external world was copied into the soul by psychical forms of perception, the representative images and ideas were translated into speech;—the effluent in which mind and matter reciprocate their respective properties. It is mind that imparts to those modulations of sound their hundred thousand distinctions. When they rise to full utterance of soul they are a swelling harmony of many thoughts, of many desires, translating the heights and depths of human passions, the fervour of devotion, the refinements of metaphysical abstractions, into symbols of intellectual and moral wealth, for augmentation of wisdom and virtue in the mass of mankind.

The vocabulary of a highly civilised people, as Greeks or Romans, English, German, French or Italian, comprises many thousands of words, with various inflections, technical terms, and proper names. "What proof is this of the grasp, of the elasticity of mind, that it can, with a sovereign ease, and just as a man lays down one tool and takes up another, so lay down and take up at pleasure this or that voluminous machinery of signs!"[1] This wonderful apparatus, however, is but a material machinery; and found scanty, inexact, feeble, and in no wise commensurate with mind. The mind or νοῦς, receives impulses from a world of thoughts which, for want of determinate and fit symbols, are never born to augment the wisdom of man. Of what may the same mind be capable if furnished with a means of communication "homogeneous with itself; plastic in quality, and commensurate with its faculties!"[2] If the light and power of sanctified minds could pervade us, as sunlight the day, so that innermost thought and emotion were truly reflected; we should possess summative unity in speech, and that true reflection of personal consciousness, whereby pure minds reciprocally satisfy and are satisfied. We may rationally expect that language will acquire greater depth and power than we are now wont to perceive; enabling the willing to

[1] "Physical Theory of Another Life:" Isaac Taylor.
[2] "Physical Theory of Another Life:" Isaac Taylor.

reveal all their emotional and intellectual wealth; to express, in symmetry with the range of their mind, wonderful things concerning creation; and glorious truths as to the power, the wisdom, the love of God.

iii. "Human Development was wrought by a process of Civilization."

True—but only in part. Real civilization is not more a means of growth than proof of growth, and the benefits of civilization are not unmixed with evil. The introduction of civilization amongst a savage race generally proves their destruction, and manifests that progress is not something necessary and universal, but in an eminent degree contingent and partial. Of all barbarian races, we say—"they have no history;" that is, they have made no appreciable progress. Moreover, as an unnatural parent, civilization often destroys its own children: Egypt, Babylon, Nineveh, Athens, Rome, where are they? Was it not softness of manners, sensuality of life, want of high purpose, that slew them; rather than barbarian force? Or, if barbarian force, how came that to be the stronger? Those brilliant perished empires, so great in material attainments, have been swept away: only a few gigantic foundations, a few vast fragments of past grandeur, tell of their existence. Old Athens possessed a social life in which the ablest men delighted. Men of high culture found there, and nowhere else, a companionship of genius and knowledge. They were a race unrivalled in intellect, and in bodily form matchless. Other ancient civilizations, with the exception of Christianity, were good as our own. Babylon, Nineveh, Palmyra, must have been very splendid — of architecture almost superhuman; rats and mice were not their builders. That ancient statue of Chephren, the Phra, or Pharaoh of the fourth dynasty, who built the second of the great pyramids at Ghizeh, is cut out of the beautiful, but intractable, stone—"Diorite." The features are as refined and intellectual as those of a modern European. Its age may be thirty-seven centuries before Phidias, the king lived B.C. 4200. There are no signs of brutal origin in this man of early historical civilization; but the civilization was not prolonged, it wrought no permanent deliverance. It neither

made, nor wholly marred man; for sometimes, even now, near the ruins of a sumptuous Eastern palace, is found a man, princely in body and mind, amongst a horde of degenerate race: a reappearance of kingly type in a place, and amongst a people, whence and from whom the crown is gone.

It is distressing to witness the draggled, drudged, mean look of the masses, specially the women, that we see in the poor streets of London. Civilization seems too hard for their constitutions, the present conditions of their life are fast crushing them into degeneracy. Are we in "a series of cycles, every one perhaps beginning and ending a little in advance of its predecessor, but every one closing in catastrophic relapse, and a period of barbaric darkness?" We call for more brains and mental stamina in our divines, statesmen, and philosophers; who, indeed, find it hard to keep pace with their work. Are they already ceasing to run well in the race, and giving way to another people? Are the needs and vices of civilization, the excitement of quick communication, and the friction of high culture unmanning our men, and rendering women unwomanly? Is religion ceasing to influence the most progressive intellects? will a deluge of unbelief carry away the foundations of civil community? sweep away the faith and work of a thousand generations into superstition—as of Spain, into subjugation—as of India, into insignificance—as of Arabia? who knows? All experience points to termination, not to indefinite prolonging of civilization.

If our own civilization is to last, we must not ground it on material wealth, not on intellectual power, not on moral purity: not on any one of these, but on all. If skilled industry elevates the masses, gives them healthful homes and wholesome food; if intelligence guides them to the use of wealth, and forbids the abuse; if morality chastens selfishness into esteem and love: that relief of man's estate will be permanent: it will be for goodness and beauty, and for the glory of God.

Of the three elect or world-moving peoples—the Jews governing religious thought; the Greek, supreme in intellect; the Roman, ruling in law; the modern Jew is far inferior to

the ancient in true knowledge of God; the Greek of to-day is not better, but worse than his fathers; and we count the Italian—a Roman decayed. Abraham in his tent was intelligent as any ancient or modern Pharaoh of the palace; Job could give reasons exceeding now-a-day arguments; and prophets hold their own against philosophers. The absence of mechanical art does not prove that the primitive race was barbarous. The old negro was certainly far higher in intellect than the present African. The red-man of America, the Australian, the Esquimaux, are degenerate sons of a race whose glory has departed.

A remarkable instance of failure in the operation of artificial selection is furnished on a large scale by the ancient Spartans. All newly-born children were carefully examined; the sickly, and those affected with any infirmity, were killed; only the strong and perfect in form were allowed to live, and to propagate the race. By this means it was thought that strength and skill would increase with every generation, until the race became perfect in body and mind. What was the result? They had rough hard valour, strength, and endurance; but their own hardness slew them. Some tribes among the Red Indians of North America vainly cultivated bodily strength and bravery by a similar selection. Modern nations have a military selection, and militarism is dangerously prominent—degrading and destroying humanity.

Probably we shall not possess greater force, nor swiftness, nor agility, in the future. The grand air, elastic energy of step, resolute assurance of bearing, which Nature gives to her aristocracy—wholly distinct and apart from polish of manner and the urbane grace of high-breeding—belong rather to a primitive than to a wholly civilised nature. It was more common among the tents of patriarchs than in modern drawing-rooms, more frequently possessed by knights and barons of the Middle Ages than by the polished gentlemen of our cities. In mechanical skill, doubtless, advance will be considerable; industrial and æsthetic arts will grow, and with them a higher intellectual and emotional development. If right conduct comes and continues with these the duration of life will be increased: but the tendencies of

politics, society, and opinion, toward the supremacy of numbers—demoralized by recognised infidelity, or by a corrupt religion—are fatal to confidence in an earthly paradise. Communism, of which wholesale robbery is the commencement, sensuality the continuance, and despotism the end, will not establish the reign of the saints. Actual want and misery—keen incentives to outrage and lawlessness, and sometimes their justification—are not relieved by elimination of God from the world. The dream of folly, and the infatuation of vice, cannot last for ever. Those who count that they possess nothing, if they have not sensual gratifications, are envious of the gold that shines, the diamond that sparkles, and the plumed pomp of rank. Victims long enough of sleights and tricks cunningly worked by priests and politicians, they would now grow plump and sleek with delicacies.

Despite these dangers, Christianity fills our hearts with hope, and spans the horizon with a bow of promise. Christianity teaches the principle of love to God and man—while giving the motive. Christianity confirms our destiny as masters of the earth, our privilege as sons of God, and our hope as inheritors of Heaven. These are the sublime characteristics with which men, and men alone, are gifted! "I say gifted, for the surpassing organisation was no work of ours. 'It is He that hath made us; not we ourselves.' This frame is a temporary trust, for the uses of which we are responsible to the Maker. Oh! you who possess it in all the supple vigour of lusty youth, think well what it is that He has committed to your keeping. Waste not its energies; dull them not by sloth; spoil them not by pleasures! The supreme work of creation has been accomplished that you might possess a body—the sole erect—of all animal bodies most free—and for what? For the service of the soul. Strive to realize the conditions of the possession of this wondrous structure. Think what it may become. The Temple of the Holy Spirit! Defile it not. Seek, rather, to adorn it with all meek and becoming gifts; with fair furniture, moral and intellectual.[1]"

[1] "On the Classification and Geographical Distribution of the Mammalia:" Richard Owen, F.R.S.

STUDY XVIII.

HUMAN LIFE.

Personality, Individuality, Speciality.

" Between two worlds life hovers, like a star,
'Twixt night and morn, upon the horizon's verge :
How little do we know that which we are !
How less what we may be ! "—BYRON.

SHALL we soil our hands with the earths, be concerned about heat, light, electricity, the precious metals, the diamond, and there stop? Shall we condescend to that derogatory part of our nature, that offensive condition in which we acknowledge brotherhood with the sea-jelly, and animalculæ of a stream or pool; and not ascend the heights of life which are specially our praise? We are bound, if only to save endless wanderings in a wrong direction, to ascertain whether the lofty soul and god-like intellect are signs of a potential fellowship with spirits noble and glorious; whether they are the title-deeds of a brighter world; or false lights and mocking delusions? They can hardly be delusions, for if all our priests were drowned to-day, and the Bible burned to-morrow, an irrepressible consciousness of things unseen would again call for the prophet and consecrate the priest. Religion is not for the great events of life only, it is for the small. Bright with gladness to the pure in heart, a familiar friend in the family circle, it is very welcome. In hours of thoughtful solitude men rest in faith and give God thanks. The monitions of eternal truth, whispered in their infant ears, and pondered in after-days, are no dread fore-doom, but comfortable assurances concerning that life in which the weary rest and the good are happy evermore.

Our Study is of Human Life.

We are told—"Life and Mind are not substances, but the dynamical results of an organism's statical conditions. Mind is only one of the forms of Life; and Life is not an entity, but an abstraction expressing the generalities of organic phenomena." The assertion is not strictly true; for organism and function are not the cause of life, but are themselves caused by life. The initial fact, without which could be no organism, is life: it is a theorem worked out by the organism.

It is asserted—"We come into the world with a heritage of organised form and definite tendencies representing ancestral experiences and adaptations. In like manner, the mind is built up of assimilated experiences: its perceptions and conceptions being shaped out of pre-perceptions and pre-conceptions." Life is, however, something more than the synthesis of ancestral experiences—being, indeed, all that the faculty of living encloses; and mind is something more than an aggregate of past and present perceptions—we must add the potential existence of a Cognitive Faculty, without which could be no mind. Life builds up the organism, and mysteriously inhabits it; so, whether you call mind an entity or not, it certainly looks through the organism at the outer world, has views of an inner world, and strangely enough, by means of these outer and inner, can detect relations which are obscure to Sense, and relations inaccessible to Sense: the supra-sensible being got at analytically by analysis of analysis.

It is manifestly impossible that we can know the exact conditions in which organic life began. We can do little more than guess at its nature and origin. Of this, however, we may be sure—our life is not merely sensations of colours, of sounds, of tastes, of smells: for it is evident that sensations are the product or act of life, not life itself. Those who think to explain it by descending from organism to organism, quantitatively and qualitatively, going down from organic to inorganic, from masses to atoms, forget that the atoms are only the masses "writ small"—that the mystery remains. The chemist analyses water into its constituent gases; and then, by synthesis under certain conditions, reconstructs the water: but not so with life, nor the substance in which life is mani-

fested. The substance, so far as we know, can only be made by life; and without it organism is not possible. Herein lies a whole world of mystery. This seems to be forgotten by those who would slay religion: they clutch at the dagger, but, like that which hovered before Macbeth's imagination, it refuses to be grasped: the "gouts of blood" upon its "blade and dudgeon" no eye but their own can see; man lives, moves, and has his being in God.

Mr Herbert Spencer, finding fault with various definitions of life, says—"Life is the definite combination of heterogeneous changes, both simultaneous and successive, in correspondence with external co-existences and sequences."

Mr G. H. Lewes states—"Life is the co-ordination of actions, both of structure and composition, which take place within an individual without destroying its identity." The larger formula, "Life is the definite combination of heterogeneous changes, both simultaneous and successive, in correspondence with external co-existences and sequences"—may be approved by some. Others choose, as simpler, "Life—including intelligence as the highest known manifestation of life—is the continuous adjustment of internal relations to external relations."

Bearing in mind that life is the cause of organism, not itself caused by organism; and raises for itself many-chambered habitations of manifold structure and function; we may speak of it after the manner of Descartes in "Traite de l'homme," —The vital spirit is like a subtle fluid, or pure and vivid flame. It is ever regenerated in the heart, and ascends to the brain. Hence it passes into the nerves, is distributed to the muscles, and causes contraction or relaxation. This spirit not only fills the cavities of the brain, it enters the pores of its substance, and is the means of all motion and emotion. As in the groves and fountains of royal gardens, water issuing from the reservoir moves various machines, makes them play instruments and even pronounce words; so the vital spirit, lodged in the machine of an animal body, enthrones itself in the brain; or takes the engineer's seat to guide the mechanism; and thence increases or slackens, changes or suspends, motion and function. Again, the body

has been called an engine, of which food is the fuel, and blood the life-oil; but a body may have food in the stomach, blood in the veins, and nevertheless be dead. Living substances, when dead, can be converted into carbonic acid, water, and ammonia; but it is impossible so to bring them together that they give rise to the living substance. Our organization transmits impressions from without into sensation within: but life is not the organism, nor impression, nor sensation, it is the master principle or secret of all—"an original, specific, self-propagating endowment."[1]

Physical energy is correlative to vital acts, but they are not of identical nature. Heat, electricity, light, air, are materials and agents by which vital processes are educed; but life is not a mere aggregation or resultant of these conditions, materials, and powers. The living egg may be quickened by heat, and become a growing bird; but who can hatch a dead egg? As certain bodies in solution assume definite crystal forms, every form after its kind; and metals—gold, silver, copper, possess individuality, called "life;" so other bodies—agglomerating into organic form and exhibiting the properties of life—have their own special life: yet we know not the how nor the why; nor do impressions from without, though they may determine the occurrence of sensation, reveal the secret how motion is converted into sensation. The mystery of life is still hidden; nor is all life the same life; there is one life of fish, another of bird, another of animal, another of man; and man's life is threefold, *corporis vita* and *mentis vita*, life of the body and life of the mind: one spirit pervading each for the safety of both.

Everything possessing consciousness, perception, and voluntary motion, may possibly have an immaterial personal principle wholly distinct from animal tissues. There is in every animal not only a plant life, a system of organs used only for assimilation and reproduction; but, even in the lowest, a life by which it merits to be classed apart as an intelligence using organs. The immaterial principle of the beast seems to be used up in the necessary expenditure of its natural life—it goeth downward. A much greater distinction

[1] "Winds of Doctrine:" Chas. Elam, M.D.

exists between the natural life and personal life of the human being—which goeth upward. Our natural life is that into which we are born, it includes body, soul and spirit: "soul is the external aspect of the spirit, and spirit the internal aspect of the soul."[1] Personal life is the centre or identity of our being in every stage and condition of growth. It is the ego, capable of introspection, to apprehend and comprehend the interests of our existence in self-representation, common to all men as men, and elevating us above plants and beasts.[2] We are not merely plants—with life indeed, but no soul; not merely animals—with soul indeed, but no spirit; but men—with life indeed, soul indeed, and spirit indeed.

Mechanical self-adjustment, or automatism, does not explain all the actions of brutes, it is less able to define human conduct. Some of our acts, which at first required attention and skill, become automatic; but this only reveals the fact that mental states have no resemblance to the physical states causing them. Life cannot be weighed in a balance, nor measured by scale, nor tested in crucible, nor seen by microscope. Our sensations, volitions, consciousness, power, are not wholly from animal organs. Everybody knows that brain is inseparably connected with the operation of thinking, and that the nerves are correlated to our sensations; but thought is not explained by the hard word "cerebration;" nor is any new light cast on sensation by calling it "an affection of sensory ganglia." We are wholly incompetent to understand the connection between molecular processes and the phenomena of consciousness. Very different kinds of emanations, vibrations, and powerful agencies, act in and around us; tastes are brought into alliance with thoughts; sensual things are relieved, ennobled, and graced by intermixture with ideas of beauty and order; so that our bodies are a point of contact for two worlds—mind and matter: in both of which worlds our volition counts for something, and we have duties to perform. Embodied, our mind is educated: its peremptory and efficacious impulses to put moral and

[1] "Bible Psychology," p. 179: Prof. Delitzsch.
[2] "Bible Psychology," pp. 180, 476: Prof. Delitzsch.

intellectual faculties into activity spring from the corporeal constitution. This constitution commences its education in bodies terrestrial: "first that which is natural, afterwards that which is spiritual:" it is a curve whose elements having been determined in a world of observation and experiment is prolonged into a future world: hence we accept the unbroken sequence of development.

Bones, muscles, nerves, come between mind and that which is outside of mind; but they are instruments only by which the molecules of the blood, or of the organism considered in the aggregate, are moulded into the peculiarity of their own type. This process of integration and reintegration, by which diffused units are arranged into special compound forms, seems akin to the polarity of crystals—a power of whose nature nothing is known. The totality of the living tissue, or a zoological individual, is a zoon, or person, possessing union of parts, and separateness from other objects; possessing a centre, or axis, able to carry on independently that continuous adjustment of inner to outer relations without which could be no life. Life acts mechanically in every person, but, in the very act, we are conscious that our mind, which moves the mechanism of life, proves that we are more than a material machine: for if all vital action is the result of molecular energies, and there is no substantial difference between the protoplasm of lobster and that of man, then the functions of both should be identical, but the lobster is confined to intuitive motion and reproduction, while man possesses multifarious and complicated activities of intellect, emotion, will. Moreover, that function of the brain, memory, is a book of blank leaves which we continually write on, as with magnetic fluid, to ensure the survivance of our embodied personal consciousness. Nor are the leaves always open, though they are the infallible means by which we know the integrity and continuance of our personality. Nor when the leaves are open, do we find the characters all legible; but, nevertheless, we continually repossess our past existence; and learn, by successive states, even to project ourselves into the future. It follows, from all this, that our personal life is a real thing; and that we have open doors in the palace of

our dwelling, and run through them to comprehend, to taste, to admire.

On the ground of Personality erect the scheme of Individuality.

The simpler forms of individuality are seen in the percipient, voluntary, reasoning principle of brutes: but as there are two corporeities in man—a natural body and a spiritual body (1 Cor. xv. 44); so are there in brutes the animal tissue and the immaterial principle, but the immaterial principle seems used up in the expenditure of natural brute life. Man, animal, bird, fish, plant, are all from one source: the Almighty caused them to grow out of the ground, every one in its order, every life of its kind, and man according to a Divine Pattern, as saith Leibnitz—"Les perfections de Dieu sont celles de nos âmes, mais il les possede sans bornes: il est un océan, dont nous avons reçu que des gouttes."[1] Between the instinct of a brute, not knowing itself; and the consciousness of man determining itself from itself, is an impassable gulf. Individuality is the peculiarity of the individual man, whereby he is distinguished from the other beings of his kind. Individual is opposed to species, and person to nature. To put it more familiarly —the Hottentot, the Australian, the black fellow, and "swinked hedger," have common personality say—with the members of the British Association; but, individually, they are as distinct and separate as is the President from the Queen of Ethiopia.

The true life of this personality and individuality is in the spirit. The body, in itself, is lifeless except as by the spirit. Flesh and spirit are contraries; except, so far as flesh becomes formed and informed by endowment with soul. Flesh, בָּשָׂר, and spirit, רוּחַ, are in contrast (Gen. vi. 3; Is. xxxi. 3; Jno. vi. 63). Man originated in a body of earth, specially fashioned, and breathed into; and is thus the synthesis of two distinct elements. The outward, being more than a veil or covering for the inward, is penetrated in every part by the inner essence; indeed, the relation may be called sacramental, the body being the outward and visible sign of an inward

[1] "Theodice"—the Preface.

spiritual mind; the two losing or merging their identity in giving man his. The spirit in man was not a portion of the Divinity, but man's spirit related to the Eternal Spirit as effect to cause. It is customary, in Scripture and in conversation, to speak of man as body and soul (Gen. ii. 7; 1 Sam. i. 26; Job iii. 20; x. 1; Ps. lxi. 9; Prov. iii. 22; Matt. x. 28); but the more comprehensive expression is—body, soul and spirit (1 Thess. v. 23; Heb. iv. 12): for even our fleshly life is the work of the spirit of life, and unites the soul with the spirit. Soul and spirit are nevertheless separable elements in man, but there is no gulf between them; man has not three lives, but one life; he is not three persons, but one person; he is three natures in one person.

It may be said—"soul, נֶפֶשׁ, is applied to the beast;" so it is, and means the person of the beast, not the beast as a person; and we can only apply soul to man as person in the human body: nevertheless, the soul in beast and the soul in man are in essential diversity. The brute has soul person, or a living nature, by that cosmical life which pervades all nature. The body of man receives soul—not by cosmical, but by Divine life (1 Cor. ii. 11). The spirit is the power of self-consciousness, the soul is the place, the whole man its object. The spirit is that which comes from God, and is of God; it is the pneuma, or candle of the Lord in man, the power of progressive and improvable reason, but chiefly the power of will in selecting good or evil, true or false, right or wrong. Hence, we may say—The tree of the knowledge of good and evil, which was not to tempt but to try our parents, is the real criterion between man and beast: the probation of the spiritual faculty by obedience, its becoming godly and godlike, was an indication that only by the tree of life could that of knowledge be rightly approached.

Look at the fact naturally and experimentally.

Whole classes of products consist merely of carbon and hydrogen, yet every one has its own individuality. A chemist proves that a piece of graphite and a diamond are essentially the same; but we recognise their individuality by using the graphite to draw with, and the diamond as a jewel.

Regard the fact from a Physician's point of view.

Individual human peculiarities are special, frequent, and distinct. We cannot tell why one has Addison's disease, and another suffers from ataxy; why this endures cancer, and that is plagued with writer's cramp; why ipecacuanha will make some sneeze, a grain of iodide of potassium iodise one person, a grain of grey powder salivate another, and opium produce colic in a third. Nor is that all—every stage and period of a man's life from infancy to old age has its special distinctive peculiar characters; and material and immaterial peculiarities are frequent and distinct as to light, heat, electricity, food, and drugs. "We call these peculiarities, idiosyncrasies; we meet with some of them two or three or more times in twenty years, but others are so rare that a long life of varied and wide experience may have witnessed but one example. Some people are most delicate electrometers and magnetometers; and I knew one such who became blind in a thunderstorm eight years ago, and whose physical frame before and since that time is always contorted by electrical and magnetical disturbances long before the former are recognised by ordinary people, and when the latter have only been displayed by perturbations of the machinery for electric telegraphy. . . . With regard to food:—One person cannot take egg, in any shape or form; to another tea and coffee are poisons; some cannot eat flat-fish; others are put into cutaneous tortures by strawberries."[1] Such facts as these compel the recognition of the individuality, for pathological and therapeutical purposes, of every member of the human family.

Daily experience shows that there are peculiar morbid tendencies. One man will sing over ghastly toil, while another weeps with the infant in trouble. We are alike yet unlike. There are things common to all, yet in the innermost recesses of every life is something that has not been seen by the most earnest gaze. Emotions and feelings are often counted hypochondriacal, hysterical, nervous, and unreal: because thorax, abdomen, limbs, and excretions are nothing wrong. Having weighed the patient, electrically examined the limbs, looked at the retina, marked the beatings of the pulse, and not found

[1] Dr J. Russell Reynolds, "The Address in Medicine to the British Medical Association at Norwich," 1874.

him wanting; he is told to go in peace. A deep unrest; a failing power felt by him, not seen by the physician; a sense or dread of impending evil in brain or heart, weakness of intellectual grasp, and averseness as to physical exertion; seem, when tested, to be delusive notions; for he can do all things well. He is urged to disregard these warnings, does disregard them; but they come from his life's centre, and some terrible catastrophe, breaking down of the mind, heart ceasing to work, suicide, pour contempt on careful auscultation and scientific diagnosis.

The suffering man may have mistaken notions; and the unwise physician, following them, may lose his clue; but even morbid sensations and wrong notions are part of the disease itself, to be studied as a whole; and are a proof to the scientific pathologist of more than mechanical mysteries in many a disordered life. This leads the physician in his own sufferings to some one who knows him well and has known him long; who knew his parents and their belongings; and would "hit out some common-sense line of treatment, the result of much experience and far-seeing; rather than commit himself to the care of the most highly trained graduate in medicine who could see his retina, trace his pulse, qualitatively and quantitatively examine his excreta, record his temperature, and bring to bear upon his case the last generalization of the latest writer on his peculiar malady. While desiring all that the skill of the younger man might perform, he would prefer not to lose the wisdom and experience of the older friend."[1]

"With regard to many diseases, we are in a position that might be described as somewhat like that of the physiologist and the schoolboy in combination, when they have found two birds' nests. The one—the histologist—shall examine the contents of one of the eggs of each nest, and apply all his microscopic powers on the cells that he shall find; he may call the chemist to his aid, and yet fail to give, after the most searching gaze and chemical analysis, even a guess as to the nature of the bird that would be developed by the simple application of warmth to another egg which he has not broken.

[1] Dr. J. Russell Reynolds. "The Address in Medicine to the British Medical Association at Norwich," 1874.

The other—the schoolboy—looks at the shell and decides in a moment that this will become a blackbird, and that the other will produce a lark. What the relation may be between the colour, and the marking of the shells, and the wonderful constitution of their contents, that shall determine the development of this bird or of that, we do not know. What is the difference between those contents we do not know, but let us remember a quite specific and wide difference does exist between them, although it is far too fine for any of our processes of investigation to demonstrate its nature."[1]

If there is a speciality, an individuality, in the egg which escapes every process of investigation; one egg growing into a blackbird, another into a lark, no man being able to say which it shall be; may we not safely conclude that man—differing from man in ten thousand ways, and separated from the beast by a multiple many times more—has his own speciality his own individuality? And that his life, as all life, is one of the great primary facts in God's Creation? It flows along a line, and we exist instant by instant, but know not the rate of our progress, nor can we render it equable. Our individuality, our mind, are not, like the brain, prisoners in an "attic story;" but occupants of the entire animal organisation. The endless and distinct peculiarities of bodily and mental conformation constitute those recesses, or inner pavilions of our being, from which others are excluded. Therein our peculiar faculties stretch out to the full: some with inscriptions—as on a scroll; and some are transferred—as by the statuary to a fair and ample surface of Parian marble, or by the artist to a picture, that they may abide for ever. A few of us can pursue certain difficult complex speculations in peace, liable to no interior disturbance; others are exposed to gust and eddy from every ravine and temptation on the margin of their life. We know the aspect of idiotcy, but who can tell why reason is unable to hold her seat? Less terrible is it to behold the body wasted, and features sharpened by the great life-struggle; than to look on the face from whence the mind is gone. Such a sight is a startling shock to the materialist.

[1] Dr. J. Russell Reynolds. "The Address in Medicine to the British Medical Association at Norwich," 1874.

We cannot utter in language all our thoughts and emotions, they need many voices and instruments to pour forth all the harmony; but every good man confesses—The renovation of my nature, when brought about, will be effected in a manner bearing upon my peculiar condition, as individually accountable—and prays,

> "God accept me.
> Christ receive me."

The Speciality of Human Life.

> "The peak is high and flush'd
> At his highest with sunrise fire;
> The peak is high, and the stars are high,
> And the thought of a man is higher."
>
> TENNYSON.

Human nature, in its present form, is only the rudimentary stage of an extended and more desirable existence. The future lies so involved in our bodily and mental organization that we discern traces within our inner man. This inner man makes us somewhat like those poets of the grander and more comprehensive genius, who have in them two separate men—the ideal and practical. There is something in our mental and moral history which far surpasses whatsoever may be accounted analogous in the guiding instinct and material changes of the body; and exceeds everything that any combination of material forces can produce. A heathen could go thus far—"Aperta simplex que mens, nullâ re adjunctâ quæ sentire possit, fugere intelligentiæ nostræ vim et notionem videtur."[1] "There stir within us yearnings irrepressible, longings unutterable, a curiosity unsatisfied and unsatiable by ought we see. These appetites, passions, and affections come to us, not as Socrates and Plato supposed,[2] nor as our own great poet, Wordsworth, sings, from the dim recollection of some former state of our being—

> "Our birth is but a sleep and a forgetting.
> The soul that rises with us, our life's star,
> Hath had elsewhere its setting,
> And cometh from afar."
>
> *Intimations of Immortality.*

[1] Cicero De Nat. Deo lib., x. c. 11.

[2] See Plato's 'Meno.'

"Still less do they come from the delusive inheritance of our progenitors. They are the indications of something within us, akin to something immeasurably beyond us; tokens of something attainable yet not hitherto attained, signs of a potential fellowship with spirits nobler and more glorious than our own; they are the title-deeds of our presumptive heirship to some brighter world than any that has yet been formed among the starry spangles of the sky."[1]

As to the brain, Dr Andrew Combe says, "We cannot conceive, even in the remotest manner, in what way the brain—a compound of water, albumen, fat, and phosphate salts—operates in the generating of thought." We know and feel that thinking expends force; close, earnest, continuous application of the mind to high studies is hard work, and produces bodily exhaustion; but the power producing the impresses, by which we derive our conceptions, runs up, and is lost in the mental region; as well the faculty of knowing, as the materials of knowledge, being vastly more extensive than they appear. The mind which discerns stars and systems incalculably remote, and foretells their future movements, warrants belief of everything concerning the future which can be proved to come within the compass of analogy.

Now take a Mechanical and Chemical View.

A bowler, who imparts a velocity of 30 feet to an 8-lb. ball, consumes in the act one-tenth of a grain of carbon. A man, the weight of 150 lbs., consumes the heat of a grain of carbon in lifting his own body to the height of 8 feet. Jumping from this height the heat is restored. The consumption of 2 oz. 4 drs. 20 grs. of carbon would place the same man on the summit of a mountain 10,000 feet high. To maintain all this, he places food in his stomach, as so much combustible matter. It is dissolved by chymical processes, and the nutritive fluid is poured into the blood. It comes into contact with atmospheric oxygen, admitted by the lungs, and the production supplies animal heat, nourishment, and replaces that which has been used in the wear and tear of life.

This, which is quite true of the body, as a machine; quite true, as to physics and chymistry; is applied to the brain; and

[1] "Modern Science and Natural Religion:" Rev. C. Pritchard.

thence, altogether erroneously, to the mind: so much blood, so much phosphorus, so much heat, without which will be no brain, no thought. We say erroneously: for the difference is not only of degree but of kind that separates between the genius of Pascal and the mind of an idiot who suns himself under the wall that shelters him. The expenditure of the same heat, phosphorus, blood, will produce totally different results in the brain of Marat or of Howard, of Napoleon or of Milton. The adjustment of nutriment, qualitatively and quantitatively alike, to two brains, does not produce even the same kind of consciousness: the difference shall be as of light and darkness, as of good and evil, as of pure and impure. Hence, allowing that the physical frame is to be interpreted physically, the same process utterly fails as applied to the life—to the mind.

The molecular motion of the brain, linked to consciousness, has its own series of physical processes: but the stirring, the thrilling, utterly fail to explain consciousness, or why the same action, in the same parts of two different brains, shall lead in one case to murder, in another to the saving of life. The physical quantitative huckstering process is delusive when applied to the mind. Our success in life, our happiness, our moral state, cannot be measured by physical or chymical analysis, or by synthesis of the material elements composing our brain. It is impossible by any skill of man to explain the speciality of that internal action by which the same physical nutriment is perverted to desperate wickedness, or used to good-will, or becomes a power that makes for righteousness.

View the whole as a Physician.

The physician must not so correlate vital and physical powers as to ignore the fact and speciality of life. Life lies in the organism, and translates physical energy into vital acts. Physical science assures us that there are many agents active around and within us, which, though they make themselves known by their ultimate effects, are not directly cognisable by eye or ear, by touch, or taste, or smell. The five senses do not reveal everything to us; and it is certain that manifold agencies, of which at present we know little or nothing, add to or take from our life-force. Great, therefore, is the error in the treatment of disease; when, in place

of conserving vital force, vital action is elicited. The processes of life may be changed, and seemingly for the better; but the patient is none the better, rather the worse. On the other hand, having lessened the force and frequency of vital functions, that are beyond the normal range; the result is evil. Stimulants are given to help a man through his work, and he has done things that otherwise he could not; but his life has been wasted; what he required was food and rest, a nourishing of organism, a building up of tissue, and restoration of energy.

Various ailments have their speciality indicating speciality of life. The most frequent cause of their occurrence, and the most potent elements in their eteology "lie in the working of those social, moral, and intellectual processes, which are unlike and apart from anything which can be even tortured into resemblance to the causes of disease in animals." The cares of professional life, worry, excitement, luxurious idleness, the intellectually guided epicureanism of sensual excess, the urgent pressure of family and social needs, "the fierce conflict between moral sense and religious training, on the one hand, and doubtful practices and honest and dishonest scepticism, on the other, are the most fruitful causes of loss of rest, recourse to stimulants and narcotic drugs, failure of appetite, disturbed digestion, mal-assimilation, nervous breakdown, and all the thousand ills that flesh is heir to. I say designedly 'that flesh is heir to,' because I am now speaking of bodily ailment only, and affirm that this kind of causation of malady is peculiar to man, and that we lose sight of much it behoves us to consider if we fail to see the broad line of distinction which, in this particular, separates him from the animal kingdom to which he is allied." [1]

"The inferences drawn from the phenomena of diseases apparently common to animals and men have been pushed too far. The differences between the human and the animal organization have been sometimes lost sight of." [2] Variola

[1] The Address in Medicine by Dr J. Russell Reynolds, forty-second meeting of the British Medical Association held at Norwich, 1874.

[2] The Address in Medicine by Dr J. Russell Reynolds, forty-second meeting of the British Medical Association, held at Norwich, 1874.

and Vaccinia afford a striking illustration of the difference between human and animal organization. Many examples show that to infect human beings with virus from the animal world there must be the innoculation of its poison. The action of many drugs is different in animals to that which occurs in man. Mercury fails to increase the biliary secretion of dogs, and opium causes diarrhœa. The furnace of human life is filled with a different fluid, heated by a different fire, and moves a more complex machine, than does the furnace of brute life. The creations, renovations, transitions, and transmigrations are innumerable; yet individuality and identity are ever preserved.

Disturbances of the higher faculties of man exhibit many forms of disease from which members of the animal kingdom are exempt. Something like the cleverness and stupidity of men may be seen in our domesticated friends—"there is a disobedience almost human;" and sailors say—"the monkey will not speak lest he should be set to work;" but insanity has never been observed in them, certainly not in the striking forms found by the physician who deals with human beings.

Not only should all the particulars which conduce to physical health be regarded; higher training or education requires equal or greater care. We recognise faculties in man, possessed by none other; mysterious windings of intellectual and moral being; powers, elsewhere only found in feeblest resemblance, fill him with joy, or cast into depths of despair, as he stands apart and alone in peculiar responsibility. Conscious of duty, and the necessity of self-sacrifice, he searches for the unseen, and looks to the future. He not merely floats or drifts on the stream of life, but controls weariness and dissatisfaction, as to the merely temporal, by a joyful belief in the Eternal. There are two worlds, and two lives—he belongs to both, whether he will or not; he must not, cannot sink to the brute.

The science of life is the highest of all sciences. Obey no misdirection, make no failure. Dark shadows and fearful loss are the lot of some: whose memory is a field of sepulture filled with carcases of evil, and only evil continually; from the dust of their corruption evil spectres will come forth to walk here-

after. The lives of wicked men project horrible wretchedness into the future; and we have fearful illustration of it in the dark shadows of present existence. Crime is developing a Cainite race. We recognise a law by which not only physical, moral taint cleaves to the children of evil-doers. The unclean thought of a polluted mind, as the disease of a pestilential body, extends its defilement even to those who are yet unborn; but the purity of the pure is a ministering angel to every life.

Few children of honest families take to theft: thieves, generally, are the descendants of thieves; of hereditary paupers and vagabonds; a race with physiological and pathological distinctions: one-third are diseased in mind, or body, or in both. Examine the heads of convicts, whether in prison or in the haunt of thieves at large, they are of brutal type: foreheads low and narrow, features coarse, and skulls, not of the high Aryan shape—but resembling the brute. Their likeness to one another, their unlikeness to the honest and pure, make known the fact—"Accumulated evil of generations has produced a low degenerate form of humanity." The clever-looking, bright, good-humoured thief? even this man is not only immoral—that is a matter of course; but often without the power of making moral distinctions. Take out those whom sudden and too great temptation has overcome, the perverted children of honest parents, the residuum is visibly brutish and bestial.

The following details, copied from the *New York Times*, appeared in many papers:—"Six convicts, all near relatives, were confined in the prison of Ulster County. The circumstance excited the attention of the United States Commissioner of Education, and he took the pains to trace back their genealogy to a single family of sisters, who had lived among the woods and fens, long ago, in that condition of squalid misery and crowded indecency in which too many young girls live in our courts and alleys. He went on to trace out the descendants of these sisters, so far as it could be made out; following up the fortunes of rather more than half the entire race, and the results are given as follows:—One girl grew up, as hundreds of such children are growing up through the

States, without known parents (for in all probability she and her sisters were illegitimate children), without friends or education, or being reached by any religious influence. The vagrant girl grew up to a wicked womanhood, and died shortly after 1825, aged, it is believed, about sixty-five years. The family line of her and her sisters has been carefully searched, and 834 persons are distinctly traced, but it is believed that the full number of descendants is at least 1,200. The number whose fortunes are most clearly known amount to 709—327 males, and 319 females; remainder unknown. Of these, 106 were illegitimate, 164 prostitutes, 17 keepers of houses of ill-fame, 142 receiving out-door relief, 64 paupers in almshouses, and 76 were criminals. The number of indictable offences committed by them is 115; the number of years' imprisonment they have suffered, 116; the number of years' individual relief, 734. And, of the whole 709, only 22 ever acquired any property; and of these, 8 lost what they had gained."

It is quite time to cease questioning about things that profit not, and to work tenfold more for regeneration of those who are degenerate in body and in life. These degenerates are a spectacle to secularists, sensualists, positivists, atheists. The old doctrine of Original Sin is receiving awful physical and psychical proof. The evil done by a man lives in his children. Wicked thoughts, moral pollutions, selfish godless minds, are open sepulchres. The connection between moral and material condition, the marks of sin on hands and feet, the prints of vice on the face, the broken and misshapen limbs of transgression, seams and scars of lies from the scourge of villany, the crookedness of falsehood and imposture, show that evil, delighted in, afflicts polluted men with deformity. We can imagine the spirit set free to traverse space, but a prey to those malignant powers which an evil life has made supreme. No merciless tyrant encloses his victim more helplessly and hopelessly, by chain and dungeon, than do retributive miseries. Fierce and mocking they grapple with and bind the self-made slave; bear him, not from star to star, but from depth to depth of amazing woe.

Turn from this depth of amazing woe, the miseries of vice and wrought out doom of iniquity. Our lives are bad enough

and sad enough, they form but ugly pictures to hang upon the walls of our consciousness, our real business is to make them better. How shall this be done? By making our will right, and then causing it to count for something in the world. We shall make it right by finding some supreme, some universal, some attainable good to strive for:—

> "Work, without hope, draws nectar in a sieve;
> And life without an object cannot live."

Hopefully striving, we shall not only rejoice in satisfying happiness, but attain the possibility of any kind of virtue, and freedom to make our life a power.

We shall not be free in the sense that our volitions originate without a cause; but free in the manner implied by our consciousness of responsibility; the determination by motive not being casual but moral and rational; ourselves, by inner power, giving decisive preponderance to this or to that.

These motives are the fruit of desires, aversions, habits, disposition, combined with outer circumstances calling incentives into action; hence, volition is a moral or immoral effect—an effect which we feel that we help to produce and are responsible for. On this account, we educate ourselves, are subjected to discipline, exalt the desire of right conduct, and awake hatred against all iniquity.

The difference between a bad and a good man is that the latter has an aversion to evil, but desires right and ensues it. Even Necessitarians possess a strong sense of right and wrong; and confess that good or evil ought to befall a man according to his conduct. We all admit that there is a difference, must be a difference, and whoever cultivates a disposition to wrong places himself out of sympathy with his fellow-creatures, and they will account it their duty to protect themselves as against a noxious beast.

Even conceding that a man is corrupt by birth and so ill bred, that he is sold to do evil; he must be kept in fear of punishment; and made to feel punishment; that his will may be governed by deterrent motives. Hence, the benefit of the offender and the protection of those whom he would offend justify punishment. In like manner we believe that the Deity will judge every one of us wisely.

We are not mere links in a chain of causation, mere grains in a mass of existence, nor is law an adamantine barrier. Receiving impressions from nature and intelligently reacting upon nature, we weave, according to the fundamental property of our organic nature, that which is beneficial into our life and shun the hurtful. Thus we know what volition is, and the causation of it, and we need not think of will as an entity in itself, which it is not, but as the result of organic, physical, and psychical changes in the centre of our being: freedom being proved by ourselves, consciously aiding to form the strongest motive, and by our having power to obey that motive. Out of this arises the universal opinion that men can voluntarily determine their own actions. Moreover, whatever a man's theories may be, he practically ignores and discredits the doctrine that volition is lawless.

We are now

> Ascending, "with our weight of cares,
> Upon the world's great altar stairs,
> That lead through darkness up to God,"

can see how men may form or weaken, perfect or cause to perish, the function of God-consciousness in them. If we pray, as distinguished from merely saying of prayers, we attain a sense of nearness to the Master Intellect—the Over-soul—the Father of our spirit. If we never pray, consciousness of the Supreme, even if it have been formed in us, is weakened and may become altogether dead. The laying of the wood in order, that is, a reverential arrangement of our life, the sanctification of our intellect as an altar to God, the presentation thereon of our thought and emotion in sacrifice, and the going up of fervent desire from the heart, are generally necessary for the descent of fire to kindle our spirit. If a man will not endeavour to do this, but allows cold mental acts to misrepresent—not present God, or idols of the market and flashes of sensuality to spread their glamour, then there will be no God-consciousness in the garden of his thoughts, no striving as of Jacob with the angel, no talking with the Lord in the cool of the day.

Here we are on the very boundary of our intellectual powers and enter the region where most men fail; for it must

be confessed that, though making endless advance in knowledge, we are almost at a stand-still in moral goodness and spiritual-mindedness. Here we stand as if again in Paradise, in presence of the Trees of Life and of Knowledge. Too many rehearse the old tragedy; whereas, the reverse of the access to the trees should now be tried; and holiness taken as the way to become immortal.

It is not enough to possess great knowledge, that may lie outside the centre of our being: a licentious scoffer may be very intellectual; but he cannot, at the same time, be spiritual. It is true that in such a man may exist a strange consciousness of God—but not much stronger than an exercise of ideality. "If you are content," said Professor Tyndall, "to make your soul a poetic rendering of a phenomenon which refuses the yoke of ordinary mechanical laws, I for one, would not object to this exercise of ideality."[1] Men who thus speak of the soul—the organ of God-consciousness, are in danger, through disuse, of losing the Divine gift. They forget that there are three natures in man—the fleshly, the intellectual, the moral; and that there are three degrees of sin—sins of the flesh, sins of temper and intellect, and sins of spiritual wickedness. When men call evil good and good evil; when, like Balaam, even God-consciousness is abused to evil; and lies are spoken—not from infirmity, as did Peter; not from cowardice, as did Jacob; but by a speaking of his own from a love of evil; then a seal is set upon the character, Judas and Balaam stand forth.

Men of noble form shrink not from their natural standing and mental position, but adorn it with moral and spiritual beauty, and advance with rapidity to new and higher ground. Knowing that the entrance of a human being into the world, by the common course of nature, is as real a manifestation of the power of God as were the Creation of Adam, the Translation of Enoch, and the Ascent of Elijah, they do not live as creatures of a day, but establish a good foundation in the world to come. They say—"our intellectual and moral structure implies, and renders necessary, an after stage

[1] Address, as President of the Midland Institute, at Birmingham. Reported in *The Times*, 2nd October 1877.

of expansion." They feel that the natural is pierced and pervaded by the spiritual; that there is a beauty transcending all beauty, concerning which their dreams are not wholly false; a joy above all joy, which they hope to attain by a graciousness of God exceeding all other graciousness. Whether at the Bank, on 'Change, in the Mart, by the Forge, with the Plough, or striving in battle, they are well-known, and of sound understanding: are God-made men to adorn and replenish the earth. They will exult in the light and beauty of a new and fair creation in comparison with which that recorded by Moses is but as an outline. They pass into realization of the truth that the spirit's birth into the world of matter was a means whereby, even through solid extension and mechanical properties, the soul is made more personal, more exact, and possessor of joys which even angels cannot share. These joys to come, break in even now by anticipation upon the soul, as if another spirit-power had been given, rendering things ever and ever new; revealing the universe in its meanings, beauties, glories, immensities, and God as All in all.

STUDY XIX.

THE INVISIBLE.

" We have a visionary gleam ;
Is it glory, or but a dream ? "

WE have now concluded that portion of our subject, the Divine Narrative of Creation, whose special study leads to the conviction that Religion embodied the highest thought of the time, and widens and deepens with our ever-growing experience. The explanations which were given of the universe are not childish guesses made by barbarous tribes, but are equally suitable for the infancy and the grandeur of human intellect. They reveal the universe as one splendid unity, as a glorious temple of the Almighty, and the present life as that wonderful stage of existence on which, by due exercise of our freedom, we are fitted for an exalted existence. The Dogmas of our Faith being experimentally verified, shine with a light that was never on sea or shore, the light of a new world for men of pure heart.

The remaining Studies are intended to give completeness and thoroughness to the whole subject.

It is asserted, that there exists a power of perceiving what is passing in the mind of another, or of thought to read thought, which may be voluntarily exalted; but acts generally by unconscious interpretation of indefinable indications. Heinrich Zschokke, we are informed, was able to describe many particulars of an individual's past life. Certainly it is not incredible that nerve force may exert itself from a distance, and bring the brain of one person into direct dynamical communication with that of another. There is, at times in some of us, a delicacy and acuteness of hearing that, when on the sea-shore or sitting in a meadow of stillness, the ripple of the waves in soft murmurs among the pebbles and the, to all

other ears inaudible, insect music, and of grasses vibrating in responsive touch as they gracefully move, form sounds sonorous and grand as the thunder peal; or are full of sweetest harmony as had the melodies of heaven come from the upper fields. This cannot be put away as wholly a freak of the imagination; there are two parts in every sensation: what we get, and what we add to it. Some men have less feeling than others possess, but none are wholly without feeling as to the mystery of the universe, nor unvisited by thoughts of a life beyond the present, nor dead to the stirring impulses which excite belief that the sorrows of mankind will be remedied and their pleasures enlarged.

"Even in the strictest of sciences—Mathematics—it can be easily shown that no really great advance, such as the inventions of Fluxions by Newton, and of the Differential Calculus by Leibnitz, can be made without the exercise of the imagination."[1] There seems to be in nature something like a galvanic circle, something that reveals itself in peculiar processes of thought—like that which suddenly solved the problem that for fifteen years had haunted Sir W. Rowan Hamilton. The sparks which fell being the fundamental equations between i, j, k. Such facts must not be regarded as fortuitously presented. There are many instances, thoroughly well attested, in which the death of a relative at a distance has been conveyed, with all the particulars, to persons during their sleep; and there are examples of some special information, buried in the bosom of the dead, being imparted in sleep to the living. "The singularity of the facts conveyed, and the impossibility of their coming through any ordinary channel, ought, on every principle of philosophical and of forensic evidence, to be admitted as furnishing proper proof of an invisible interference."[2] Can these things be scientifically measured, or must we confess that they escape both hand and eye?

Swedenborg who, though dreamer, was yet a man of spiritual insight, states, "that the whole natural world corresponds to the spiritual world collectively and in every part; for the natural world exists and subsists from the spiritual

[1] "Mental Physiology:" W. B. Carpenter, M.D., F.R.S.

[2] "Physical Theory of Another Life," cap. xvii.: Isaac Taylor.

world, just as an effect does from the cause." Delitzsch says —"The creation realised in time is actually only the temporal realisation of that which was everlastingly present to the triune self-consciousness of God; and of the latter as of the former the same principle is true, that it is God in the totality of His nature from Whom and in Whom it has its ideal existence."[1] It is the every-day experience of a devout man that only he who lives in the world as not of it, but as belonging to the invisible, leads a true life:

> "There surely is some blessed clime,
> Where life is not a breath,
> Nor life's affections transient fire
> Whose sparks fly upward and expire."
>
> JAMES MONTGOMERY.

The doctrines of the Conservation of energy, and Uniformity of Law, require that there be no sudden wrench, or absolute break anywhere; but actually the creation and existence of the visible universe from its first manifestation to the final overthrow, from the beginning in time to the end in time, are a series of breaks in continuity and uniformity. Science rightly pushes back to the furthest our knowledge of the Great First Cause; but cannot do away with the original production of the visible universe, which must be dealt with as any other phenomenon. Alike in the external and internal worlds, we are in the midst of changes, and can neither discover beginning nor end—so as to understand them. If we entertain the hypothesis that all nature once existed in a diffused form, we cannot conceive or know how this could be. If we speculate on the future, no limit can be assigned to the marvellous succession of phenomena which is ever unfolding. If we look inward, we cannot remember how consciousness began, nor can we examine the consciousness that at present exists, nor shall we know its end: the beginning, continuance, and termination are equally mysterious in their essential nature: under all things lies an impenetrable mystery. To ignore everything but what is visible, then to tell us that this visible is only a huge fire which burns itself out, and leaves nothing but ashes—the dead worthless body of the present living

[1] "Bible Psychology," p. 63.

thing—is enough to startle everyone; and, surely, science must modify the doctrine of Continuance by acknowledging the kindling, as it owns the quenching of the fire; must allow that the visible is the realisation of the unseen; and, possibly, forms but an infinitesimal part of that whole which we call the universe.

Put the fact in three shapes. I. Did the visible spring out of an order, or no order of things, with which it had no connection? II. Will it pass into an order or no order of things, wholly unconnected with it? III. Is it a transference from the invisible; which, passing from grade to grade of realisation, becomes transposed into some other order of things with which it is intimately connected? Now if the scientific affirmation is correct, that the requisites for existence connect every organ and organism with the past—we must hold, as the very root of our life and the foundation of all existence, that the scientific doctrine of continuity, if true, is proof of a transposition of the past into the present order of things; and of the present into some other order with which it is connected. The third proposition therefore is true; so when

> "The cloud capp'd towers, the gorgeous palaces,
> The solemn temples, the great globe itself,
> Yea, all which it inherit, shall dissolve,"

there will be a continuance, or state, into which the present visible existence is an avenue. Those who, in the name of science at one end, or, in the name of religion at the other, would wall up the path and affix a placard—"No Road This Way," mistrust their own principles.[1]

The physical properties of matter have been well called—"the alphabet which is put into our hands by God to enable us to read that great book the Universe." In that universe are three mysteries: the mystery of matter, the mystery of life, the mystery of God. The laws of matter seem simplest of the three; but, how great soever the circle of light surrounding them, the circumference of darkness grows more mysterious and tremendous: matter, even as to what it is, and how it is, eludes and will for ever elude our grasp. Then, when we come to apply

[1] "The Unseen Universe," p. 211.

the laws of matter to living things, we are forced to admit the existence of something lying beyond; a something, *sui generis*, working with and through those laws to an appointed end. Passing from life to a region even more mysterious—that of mind; we find something as much transcending life, as life transcends matter. It is of no use theoretically to drive life into the structural depths of the universe; of no avail to transfer mind into the thick darkness of the durational past; of no help to conceive of the Great Cause as only operating in the eternal aforetime; we do not get rid of Him, nor of them. A scientific conception of the universe must embrace the three mysteries—Matter, Life, God; and to enlighten the depths of our ignorance we must look for that high aid which none but God can give: we must believe in the Supernatural, and that the Highest Intellectual Power will at length dominate all inferior energies.

That there actually is an ideal world which existed before the physical, and out of which the present world was formed, and which manifests itself in the varieties, eccentricities, and very order of apparent uniformity in the existing state of things, is plainly declared in Scripture. The declaration is supported by science. Whosoever knows of and believes in God, knows and believes that our life was pre-existent in the sight of God (Rom. iv. 17; Is. xxxvii. 26). Foreseen, then made actual in time, it became natural, or part of nature. God's Life, involved in the world, is distinguished from His eternal Life; faith and science pierce the phenomenal externality to the supersensuous and supernatural source, and thence realise the production of all things by purely spiritual power. The Great God, therefore, Whose eternal Omniscience contains not only that which is general, but that which is most special, not only foresaw all the possibilities arising out of the use of freedom by intelligent creatures; but looked through to the realisation of a greater plan than any that could have been accomplished without the co-operation of free intelligent creatures.

Against this we have a few sophistries which sound like echoes of the old speech from under the Tree of Knowledge.

"Everything in nature is natural, and not supernatural; or it would not be a part of nature." Then, if a bird flies into a

room it belongs to the room, and is part of the furniture. "Every unknown cause must be accounted a natural cause." Then, we are to build upon ignorance, and call the house knowledge. The folly of this being evident we are assured—"We know nothing about causes, we can only trace antecedents and consequents." Very well, then say nothing about that of which you know nothing. It is asserted—"Matter either made itself, or is eternal; in any case, it made everything else." This is a faith that unfaiths all rational belief, and can only be received by those who believe everything that is not in the Bible. We know, as well as we can know anything, that matter once was formless, and without properties; that motion must have come into it from without, was therefore supernatural, and without it nature would not have been possible. The high energy in the universe is ever passing into lower forms; and the reversal of low energy into the higher, can only be accomplished, even under the most favourable conditions, by loss of the far greater part; and when the lowest form has become universal, there can be no reversal except by infusion of energy from without. We also know that no amount of pushing things about, by force in time and space, could create the world we live in, any more than the shaking of pebbles would build Westminster Abbey; nor are the vibrations of atoms equivalent to moral emotions of will, love, reverence, in a self-conscious intellect—they are at least vibrations plus the emotions. We are told, "It is impossible for us to conceive the Supreme Being acting otherwise than we actually see in nature." Really this is babble; turn the asserted fact, "It is impossible for us to conceive the Supreme Being acting as we actually see in nature," and every atheist in the world will say "amen." "Progress," we are told, "is necessary to existence or life;" take the reverse—"progress is necessary for non-existence and death," both are true. "The highest effect is to bring man into perfect harmony with law;" yes, but the aim of all science and all intelligence is to control natural law by human will. "In obedience to law are life and safety," yes, but knowledge and power to subdue natural law are imperatively demanded for life and safety. All this shows that there

is something unseen in all that is seen, something transcending nature in nature.

Some admit that miracles are theoretically possible, but deny that any have been wrought, and would ignore them by means of truisms. "If we neglect gravitation, we shall be dashed in pieces at the foot of a precipice, or be crushed by a falling rock; if we despise sanitary law, we are destroyed by pestilence; if we disregard chemical laws, we are poisoned by a vapour." "Yes," we reply, "because God, who likes simple folk, approveth not simpletons." It has been proposed that we erect two hospitals; in one the patients are to be "physicked," in the other "prayed for." Evidently the proposer had need of both remedies. The wisdom and order of Divine conduct, whether in giving or withholding, cannot be tabulated by man; so as to form a theory of prayers, and a register of the varying degrees of faith and intensity, for production of greater or lesser results. Sickness unhealed, even as sickness healed, whether a rod or a reproof, may be for the glory of God. "God is not the author of confusion." We know that even out of folly, wisdom may be got; by gravitation, levitation; from sickness, healing; and poison, not always deadly, becomes medicine; so things contrary turn to our part.

Sometimes a fuss is made about the supernatural being unnatural—as if what came into nature from without, did not thereby become part of nature and natural. Walking on the sea is a plain reversal of laws; but so also, antecedently, is sending a message under the sea. If the latter is accomplished in our days; so the former, in the example of Christ and the experience of Apostles.

We are able to explain *why* miracles are wrought; but the definition of so unknown a quantity as *why* they are wrought is sure to be imperfect. To say, "Whatever is contrary to universal and invariable experience is antecedently incredible," is but a truism; yet what man, or nation, has universal and invariable experience? The saying of Professor Baden Powell—"In nature and from nature, by science and by reason, we neither have nor can possibly have any evidence of a Deity working miracles; for that we must go out of nature and beyond

science,"[1] is double edged; for neither nature nor science, in that case, can possibly present any evidence against miracles. Really, such sayings remind one of making a fog and then trying to escape; they also limit science to its present capabilities. It is puppyism grown into dogmatism, as Douglas Jerrold would say, to assert as a universal truth—"It is more probable that testimony should be mistaken than that miracles should be true;" for the meaning unveiled is this: It is more probable that the evidence for a miracle is false, than that other men, if there were miracles, should not have seen them. It is a flagrant *petitio principii*, an absurd attempt to correct experience by inexperience, to make every unknown and unlikely thing antecedently incredible, and to measure knowledge by ignorance. It is demonstrable, adopting the now generally received nebular theory as to the origin of worlds, that there have been continual interventions of energy; unless all the morality, intelligence, life, strength, beauty, and variety existed potentially in the primary diffused mist. Scientific theory and experiment are, however, eliminating all material properties from the primal substance: and, ere long, the evidence for intervention may assume the power of demonstration: for if the original atoms had not material properties those at present known could not have been got out of them. The ablest of our scientific men have felt that there is something more than matter or stuff in the universe, and confess that the Doctrine of Continuity, whether they go backwards or forwards, brings them to an invisible universe.

There are two classes of miracles. Those which from the very nature of the case are excluded from investigation, such, for example, as are wrought by the Glory of the Father upon the Son, say the Supernatural Birth; which must be received as "miracula de quibus ipsa est fides," not as "miracula quæ sunt ad fidei confirmationem;" the objects of faith not for the confirmation of faith. The other class are those miracles which may be tested by the manner, time, and circumstances of their accomplishment. These must surpass all the powers of nature—"præter naturam, supra naturam, contra naturam;"

[1] "Essays and Reviews: Study of the Evidences of Christianity."

not that the effect is unnatural, but such as would not have been produced had not new powers been evoked.

These latter miracles are as credible, if we have trustworthy report of them, as if we saw them with our own eyes. There really is no absolute difference between the two testimonies. In the case of many witnesses, indeed, we have far more conclusive evidence than that which could be afforded by our own unaided and uncorroborated senses.

There are three things which make miracles antecedently probable and subsequently credible: alleged adequate power, sufficient motives for their performance, permanent results arising from their occurrence.

Now as to the Power, the term δυνάμεις, seems a fit word to describe the putting forth in a τέρας, wonder, or prodigy, evidence for the existence and presence of the Almighty, or of one from Him. Sufficient motives are manifested, in a teleological point of view, by the σημεῖον, or sign, or instructive light, by which we are made to understand that the kingdom of heaven is at hand. The permanent results are the opening of those secret sources of power, of holiness, of wisdom, of mercy, which these symbols declare are for use of the children of men.

In this latter sense miracles are also prophecies: for not only do they sometimes fore-shadow future events, as in 2 Kings xx. 8-11; they also foretell the victories of the Son of God, and prefigure the rich and potent balm with which the Great Physician will heal the deep and deadly diseases now afflicting nature.

The view of God, in nature and beyond nature, moving along all radii from the infinite past into the present finite creation, physical and psychical, and passing into the infinite future, most powerfully attracts scientific students, religiously inspires them, and imparts to their glorious studies yet greater glory. They discern that God is not only outside, but within the universe; and they devoutly read the Book of Nature as the biography of the Author. They recognise that dynamical agency is fundamentally distinct and separate from material conditions. In other words, "The material conditions, in fact, merely furnish the *fuel* and the mechanism; it is the force or

power that does the work."[1] The whole process, whether intellectual, vital, chemical, or mechanical, the convertibility of physical forces, their correlation with vital, and the nexus between mental and bodily activity, leads up to that Mind whence is all power. From the apex of this pyramid, it is seen that God cannot be "cribb'd, cabin'd, and confined" within any agencies—cannot be adequately expressed by any materialistic formula. He is not a remote and retired mechanician; but, higher than the highest conception we can form of Him, He is the extension to infinity of all our noblest attributes, and certainly possesses that personality which is presence to Himself. Around Him, we conceive, is some everlasting glory, which, by self-revelation, He framed to be the Heaven of His Dwelling Place, and for the body of the light of His spiritual nature; which eternally and everywhere manifested, as the all-pervading and all-sustaining Power, is the inscrutable essence of all; without which the world would be as the baseless fabric of a vision, and thought itself would perish.

Who shall tell us of that unseen land—

> "The undiscover'd country from whose bourne
> No traveller returns?" *Hamlet.*

Is it true that there has been no return, no reappearance, no answer? Are all men liars? If so, they do not lie always. Our perceptions are twofold: sensual, by our senses; intellectual, by ideas produced in the brain, that is cerebral. Is it utterly impossible for impressions to reach our brain from an altogether different source—impressions wrought by our own organization; working on the brain precisely as do impressions from the outer and material world? It is not impossible; and their difference in origin and effect cannot always be discerned. Their instrument is the cerebrum, and the transmission of an impression along the nerves of the internal senses to the sensorium, is equivalent to that of an impression through the nerves of the external senses. Dr W. B. Carpenter, in his "Mental Physiology," says of spectral illusions—"These

[1] "Mental Physiology:" p. 694, W. B. Carpenter, M.D., LL.D.

are clearly sensorial states not excelled by external objects; and it is also clear that they frequently originate in cerebral changes, since they represent creatures of the mind, and are not mere reproductions of past sensations."

If the mind is duly impressed, a thing will seem heavy that is very light; the odour of a dead body may be perceived from a new and empty coffin, and acute agony is endured from an imaginary wound. The influence of ideas on sensitive subjects is so great, that flames have been seen to issue from magnets, and luminous phenomena became visible in dark rooms, sounds were heard in perfect silence, and intangible things were touched. Imagination has produced various shades and brilliant coruscations of flame from bare walls, until, self-deceived and spell-bound, the victims became a prey to their delusion; a delusion which proved the extraordinary power of mind over body. It is obvious that this fact, "real sensations are produced by mental states," enables us to understand how Sir Isaac Newton could recall the spectrum of the sun, by going into a dark room and intensely applying his mind; and explains the fact of some men being able, at will and at any time, to surround themselves with spectres; and how others, without will but at any time, may be haunted by horrid illusions. Sir Walter Scott, in his "Demonology and Witchcraft," gives an example—"Passing from his sitting room to the entrance hall, fitted up with the skins of wild beasts, armour, etc., he saw right before him, and in a standing posture, the exact representation of his departed friend (Lord Byron), whose recollection had been so strongly brought to his imagination. He stopped for a single moment, so as to notice the wonderful accuracy with which fancy had impressed upon the bodily eye the peculiarities of dress and posture of the illustrious poet. Sensible, however, of the delusion, he felt no sentiment save that of wonder at the extraordinary accuracy of the resemblance, and stepped forward towards the figure, which resolved itself, as he approached, into the various materials of which it was composed—great-coats, shawls, plaids, and such articles as are usually found in a country entrance-hall."

Apply these admitted facts—The visible universe and man's

physical frame are connected by bonds of energy with the invisible, are capable of receiving energy from it; and there exists a bridge between the two—a something that welds the two into one. The motions which produce and accompany thought affect the whole order of things—visible and invisible. Thought may scientifically explain the past state of the earth and by prevision foretell its future condition. Science, in fact, accepts as physically probable, that which true religion asserts as spiritually true: that Moses was enabled to reveal the past, and that prophets were inspired to explain the future. We do not offer this as an explanation of the power of prophecy, but as an attempt to show that so far from prophecy being impossible, there are states of mind in which science may shortly be able to show that it is a real though an unusual, possession.

Explanation will make this clear. We do not doubt the possibility of a science of meteorology; nor of science dealing with phenomena which are the product of many and complex factors; nor do we, while allowing that sociology cannot be brought under the control of mathematical deduction, refuse to admit that physiologic and psychological laws are true, precise, and inevitable in their result. Accepting the fact, there is a sense in which Buddhism and Mohammedanism might have been predicted. The production of gigantic personalities, and the peculiar impression produced by them, could be foreseen, such predictions being possible to an intellect able to contemplate and comprehend the many and intricate factors producing and controlling the progressive life and opinions of the world. This prevision, at present, is crude work: little more than guessing; but can become systematic and thorough so soon as we know, and are able to trace the application of law to the vastness and variety of biologic phenomena. That the antecedents of the phenomena are irresistibly working out their results is certain; our knowledge of them is uncertain, owing to their vast complication; owing also to the operation of that unknown factor—human will; but the science is already in existence, and gathering precision with the development of human skill. This being the case, so far from men of science refusing to acknowledge

prophecy, they can conceive the flash of prevision as somewhat similar to the sparks which fell into Sir W. Rowan Hamilton's mind concerning the long sought fundamental equations.

Pass to another series of thought.

When we dream, it is often against our expectations and wish. Things, which we would see, are not seen; those, not desired, forcibly intrude. Insight, invention, origination, even creative genius, bearing the well marked stamp of our individuality, yet transcending ordinary power, are possessed in dreams. The imagination is sometimes constructive, at others lucky guesses are made; and a dullard, when awake, will pass, in sleep, through rapid thought and years of experience in the twinkling of an eye. The mind not only feeds upon the store of past ideas, but works them up into never-ending combinations; and those who have become deaf, as in the well known case of Beethoven, will compose music involving new combinations of sound; and men who have lost their sight, rejoice in the imagined beauties of a glorious landscape or a visionary picture.

Condorcet, in his dream, found the last steps of a difficult calculation which no power of his waking thought could discover. Tartini, in his dream, heard, as he thought, the arch-fiend play; but when awake could not satisfactorily produce the visional music; and Coleridge's Kubla Khan is notable as a dream-poem. So true are dreams to us while they last, and work in such new shape and unaccountable directions, that intended crimes have been prevented and past crimes have been discovered—not by mere coincidences, but by some occult action of the mind. Some impression, or succession of impressions in waking moments, has given to the dreamer an almost revelatory power. The wife of General Sleeman slept within a tent which had been pitched in a lovely opening of a jungle. Her dreams were haunted all night by the sight of dead men. The General, because of information which he had received, caused the ground to be opened, and fourteen corpses, victims of the Thugs, were discovered. It is easily conceivable that the foul odour of these dead suggested to the lady, in the unconscious cerebration of the dream, the horrible vision.[1]

[1] "Mental Physiology," p. 590: Dr. B. W. Carpenter.

Sometimes, dreaming, with closed eyes we see the realities around—our bedroom, and everything in it; our library, and persons entering. We are fast asleep, it is a dream—but the objects are true clear and defined. The horizon of the dream expands, the whole street is seen, distant places are brought nigh, and the inward scene is a true picture of things really existing. At times, old things become new; forgotten events are remembered; words long ago said, in a now unknown language, are repeated; the dead appear as living; and, as by clairvoyance, there are visions of the absent. Inward influences seem the stronger the more our brain is given up to rest and sleep: or, as others assert, the operation is carried on not when we sleep soundest, but with the maximum of sub-consciousness consistent with sleep.

Whatever these perceptions are, unconscious, sub-conscious, flashes of insight scientific or poetical, our brains use them in the same manner as were they outward impressions received through the senses. They are not a mere play of the fancy; for when we are awake, no imagination, no fancy, has power to produce the objective perceptions and realities of a dream. Some persons when they dream, are as dramatic as Shakespeare. Sometimes, on awaking in the morning, there is no remembrance other than a confused notion of having lived another life in sleep; but in course of the day, some trifling incident, that has no apparent connection with dreamland, recalls the whole procession of events to form a living mental scene in the light of day. Most of us, awaking, have to fight our vivid perceptions before we find that they are only shadows; and important events float before the soul—the soul veiled in doubt whether they are visionary or real. We do, or think we do, unreasonable and impossible acts—unconscious that they are so. We dream that we dream, or dream that we awake, and thus the dream is yet more clothed with the realities of life. Sometimes our spirit seems apart from the body, and looks on the dead clay. We are in a cave, consorting with ghosts and idiots. Walls even are no hindrance, and space has no limits, though all the conditions of physical sight are absent. Men, who never painted, conceive pictures most charming and artistic; the

unpoetic have glowing thoughts, clothe them with the language of Tennyson or Byron; and the unmusical make to themselves exquisite melody.

Such dreams cannot be produced solely by outward influences on our senses; unless we are like a harp, which, uninfluenced by outward sound when played on, resounds with gentle excitement and sympathetic nerve when not played. Even so, how is it? the eye sees when no light shines: the ear is filled with melodies, discords, or cries of anguish, when no sound is without; the sense distinguishes odours, nerves of taste are delicately excited, and there seems no cause—except that of the brain's peculiar fancy. The fact is, we possess a power by which we see and hear, taste and smell, and fill space with forms, when our outer physical senses are closed to the external world: we are endued with a faculty of seeing from within, unaided by impressions from without. Does it not render possible the actual existence of a power by which visions of every kind—prophetic as to the future, inspirative as to doctrine, perceptive as to facts, revelative as to Divine dealings—are brought within the circle of human knowledge and experience?

Lord Brougham recorded a most marvellous incident.[1] In his youth he had frequently disputed with G—— on the immortality of the soul and on a future state. They actually committed the folly of drawing up an agreement, written in their blood, to the effect that whichever died the first should appear to the other, and thus solve any doubts they had entertained of "the life after death." They grew up, and Brougham had well-nigh forgotten his young friend who went to reside in India. On the 19th of December 1799, after a day in the cold and open air, in Sweden, Brougham had a warm bath. While lying in it, enjoying the comfort, he turned round and looked toward the chair on which lay his clothes. There, on the chair sat G—— looking calmly at him. The apparition was so startling that Brougham fell down, and on recovering his senses was sprawling on the floor. There had been nothing to recall G—— to his mind, nor had he thought of him; yet, though regarding the whole as a

[1] "Brougham's Life and Times," vol. i., pp. 201-204.

dream, he felt sure that G—— was dead. Returning to Edinburgh, he received some time after a letter from India, "announcing G——'s death! and stating that he had died on the 19th of December"!! Singular coincidence, and an analogy of some of the affairs of life, so Brougham regarded it. Like other ghost stories it is, of course, capable of explanation; but who shall explain the explanation.

"Between the two states" (of dreaming and somnambulism) "there is a gradational transition. There are many, for instance, who talk much in their sleep, yet never attempt to leave their beds and walk. And among sleep-*talkers* there are some who merely utter meaningless sequences of words, or strangely jumbled phrases, and are incapable of being influenced by suggested ideas; whilst there are others who give utterance to a coherent train of thought, still without any receptivity of external suggestion; and others, again, obviously hear what is said to them, and attend to it or not according to the impression it makes upon them. . . The Somnambulist differs from the ordinary dreamer in possessing such a control over his nervo-muscular apparatus, as to be enabled to execute, or at any rate to attempt, whatever it may be in his mind to do; while some of the inlets to sensation ordinarily remain open, so that the somnambulist may *hear*, though he does not *see* or *feel*, or may *feel*, while he does not *see* or *hear*."[1]

Somnambulism, viewed simply as night-wandering, is a dream of reality for a direct purpose; and nature is generally the guardian in such perilous and mysterious walk. Somnambulists avoid every obstacle, walk on narrowest paths, climb dangerous heights, leap precipices, write without mistake, are conscious of the outer world by other means than their external senses, and certain faculties of the brain are used with greater precision and perfection than when awake.

Carrying these facts into the region of magnetic sleep, we find that the Clairvoyant Somnambulist may have the attention directed to any place he wishes to see; where he will know everything that happens, and perceive, so it is asserted, things in advance which do not yet exist; but will happen, in course of time, as sequences of accidentally working causes.

[1] "Mental Physiology," p. 591: Dr. W. B. Carpenter.

This, as also spontaneous somnambulism, brings visions, which do not arise from outward influences, into relation with perceptions which are derived from the material external world; and dreams having reference to the health or sickness or death of the dreamer, have been verified by events.[1] Such dreams may be called prophetic or clairvoyant; others can be explained away as mere misgivings and forebodings.

Genuine sleep may be produced in a few moments; and the Biologized subject will be caused to sleep by the expressed determination of the operator that he will; not only so, but spontaneously to awake at the time he was directed. Metals, accounted the simplest and primitive productions of magnetic force, are said to be related to the system of ganglia in the same manner that the brain is related to light. Persons are not only sensitive to contact with metals, but even without metals or magnets, the Biologised "subject" may be acted on by mere suggestion; and the mind, which has lost the power of volitional direction, will be in complete subjection to a dominant idea given by the master mind. There may be no need to call in any special or new force to explain the influence which is exercised over what are called good "subjects." There is a power of paralysing the volitional power of some persons by a masterful expression of determination, by positive assurance of certain things, and earnestness of suggestion, so that the subject is made to assume the personality of the operator. "The undue repetition of such experiments, however, and especially their frequent repetition upon the same individuals, are to be strongly deprecated; for the state of mind thus induced is essentially a morbid one; and the reiterated suspension of that volitional power over the direction of the thoughts, which is the highest attribute of the Human mind, can scarcely do otherwise than tend to its permanent impairment."[2]

In the higher degrees of somnambulism, the "rapport" between magnetizer and magnetized becomes so perfect that the latter is conscious of all that is passing in the brain of the magnetizer, of all impressions received by him from without,

[1] Fabius. De Somniis.

[2] "Mental Physiology," p. 565 : Dr. W. B. Carpenter.

and is entirely under his control.[1] If this be the case: if hundreds of trustworthy witnesses assert that somnambulists, in a state of clairvoyance, are able to see what is absent, hidden, and distant, or what is even yet future; how is it possible to dispute or disbelieve the power of prophecy, the dreaming of dreams, and seeing of visions by the ancients? If such a force comes into play during magnetic sleep, "why should it not show its power at certain moments of our life, when we are awake, placing coming events before us either in a direct or allegorical form?"[2]

We are able, in conception, to separate space and time from pure intellect; and efface all distinction between the near and the distant, past present and future; proving that there is no insurmountable barrier to the occurrence of prophetic visions, "visio in distantia et actio in distantia," instantaneous acquaintance with events happening at any distance both in space and time. "If we hear that clairvoyant somnambulists are capable of seeing, in advance, what is to happen in the future, we must assume that they had an insight into the hidden and secret machinery from which everything proceeds, where everything is already at the present moment what it will be in future, and which represents itself only seen from without through our optical glass-time—as a future and coming event."[3] We do not understand this, nor wholly endorse the statement; but wait every reverential attempt to reveal the secrets of matter and spirit, everything which gives an insight into the hidden machinery by which our Father moves the world.

Consider the mechanism of these various actions.

Suppose that a new idea is attended by the passage of a wave of molecular motion along a new path of the brain, and an old idea is the passage of a wave along an old path; the recollection of these ideas is the passage of later waves along these paths, and memory is the keeping open of the paths by a continual transit of waves. Reflex action and instinct, travelling along these fibrous paths or transit lines connecting nerve cells, are

[1] "Spiritual and Animal Magnetism," p. 65: Prof. G. G. Zerffi.
[2] "Spiritual and Animal Magnetism," p. 94: Prof. G. G. Zerffi.
[3] "Spiritual and Animal Magnetism," p. 69: Prof. G. G. Zerffi.

the simplest psychical phenomena; and, as a matter of fact, arise without any corresponding experience; so that Fly-catchers catch flies, and young Pointers indicate the birds, previous to any experience. We are told, the experience of past generations has determined these peculiarities of demeanour, and produced "the automatic cohesion of psychical states." The explanation only puts the difficulty further back: brings the experience of a race within a nervous arc, makes the repetitions in whole life-times of countless ancestral Fly-catchers prophetic of similar phenomena in generations unborn, rather elevates automatism in height of mystery, and brings it nearer to conscious psychical life-emotion, memory, reason, volition; while these latter, are thus shown, not only to possess that prevision which the astronomer or chemist has by knowledge; but to possess the sines of the angles of incidence and reflection in such constant or varying, yet perceptive rates, as differ only from the definiteness of actual knowledge in the remoteness and complexity of prevision.

We confess that the words used are like counters, partly of spurious, and in part of uncertain value; but, in the use of such counters, philosophers try to establish their theories of progress, some by progression, others by retrogression, yet others by ever-recurring cycles; and thus we shall find, if it is to be found, the lost secret of the foundation of Rome, and attain a science of history. A sufficiently elevated and enlarged mind may discern that prophecy, like sociology, is not the product of few and simple factors, and cannot be brought under the control of mathematical deduction—yet, as there is unquestionably a science which could have foretold Buddhism or Mohammedanism, there is as certainly within any mind sufficiently vast, if indeed we admit causation and a definite order of sequence, a set of formulas of the activities of forces—including the motions of the sidereal universe for all ages, with all the arrangements for origin, maintenance, development of life, not omitting the yet more complex differing actions of free intelligences—by which everything is brought out of helter-skelter and fitted into Divine science. That race, or nation, or family, or individual, is highest in intellectual power who is capable

of vividly realizing groups of future conditions, and adapting the conduct thereto.

Magnetic and other energies stream forth from our bodies, and produce strange effects. The strokes of a magnetizer's hands give direction and decision to the will of the magnetized. These energies, whatever they are, must be tried by experimental physics. All energies acting on matter, if our science is correct, operate according to certain laws: but where is the explanation of this mystery? There are moments in which our senses of vision and hearing may be awake and active with that mysterious power of perception, which effaces from our consciousness all distinction between the past and the present, the far-off and the near, and seems to be unrestricted both as to time and space. It is asserted that coming events can be and are placed before us in a direct, or in an allegorical form, in which may be traced a thread of causation. Thousands of persons, clerical and lay, rich, poor, learned, ignorant, pagan, Christian, sceptic, have had spectral, allegorical, prophetic, and second-sight visions. If these visions were due to magnetism, if that be the means by which God pleases to make the preternaturals to be natural, and to bring the invisible into view, well. If in some way, not understood, but more instantaneously than the mind of man in England communicates by means of metal wire with the mind of man in America, God pleases to reveal Himself to us, and vouchsafes a view of unseen and eternal things, are we to refuse it because men think that they can explain the process? When, all the while, even at the utmost, they only know the manner of the doing, nothing of the power?[1]

Science asserts that the operation of this force, if force it be, cannot be relied on; it is capricious and erring: more frequently calling visions from the chambers of imagination, than evoking the shadow of coming events. Real and maddest delusions—which are not unfrequent, can scarcely be separated from the few rare cases of actual prevision. What of that? in a little while we may be able. It has been said with truth that the boundary is narrow between genius and madness, but will any one on that account deny the

[1] See Isaac Taylor's "Physical Theory of Another Life:" p. 210.

reality of genius or the wonders it has wrought? Can the existence of Inspiration be more reasonably denied because its utterances are counterfeited by visionaries and mystics? There was something in the mind of John, the Apostle, which assured him that he did see things in Heaven; and something which convinced other men also. Future prophets will possess and communicate the same conviction. In any case, we are so far from being acquainted with all the powers of nature, and their modes of action, that it is unphilosophical and unscientific to deny assertions even of the most startling phenomena, simply because they are startling. The admitted circulation of a magnetic fluid in us, gives a new spirit not only to our bodies, but to the mechanism of the world. Natural energies may become almost supernatural; and some kinds of miracles, essentially inexplicable as all miracles are, may receive a measure of explanation; and yield light concerning that life-giving energy which pervades the universe.

The Occult Sciences afford no explanation of the mystery. They are rejected by most thoughtful men as false; and condemned by Scripture—not as wholly false, but detestably wicked. Sorcerers, witches, astrologers, interpreters of dreams, revealers of signs, still exist; but are accounted degraded beings, even by those who seek them. The practice of the dark arts is rooted in savage life, and for the most part guided by antique rules; but it cannot be limited to low levels of civilization: for the development and elaborate systematization, say of astrology, are the work of great men in the ancient and mediæval world; and the evolution was by processes still understood and attractive to the human intellect.

It is not a little mortifying to physicists who have long sneered at the words of Bishop Butler—"I cannot but judge it highly probable that every faithful person at least hath his particular good genius or angel, appointed by God over him, as the guardian and guide of his life"[1]—to find doctrines concerning disease-demons, helping angels and ancestral spirits, even now inculcated by men of distinguished mental

[1] "Sermons:" second edition, 1714, vol. ii. p. 506.

power. One of the favourite taunts, used by scoffers of Scripture, to vex pious men, was taken from the Divine Laws against the Seekers of Evil Spirits. The laws, it was asserted, were cruel in enacting death as a punishment; and were intensely silly because no evil spirits exist. Some of these revilers are now Seekers of the Dead. They talk of "elective affinities," of "spiritual matches," and are being prepared—some for physical debility, some for profligacy, some for insanity. The *séances*, counted free from vice and ecstacy, are intensely trivial and of low-culture. A wild North American Indian, except for the spelling and writing, would be at home in a spiritual séance at London. It is not improbable that, ere long, the culture may equal that of the Chinese; and the devotees possess a War god, a Mechanic's god, a Swine god, a Gambler's god; and recognize in the desperate gamester a devil gambling for cash; and distinguish hog-breeders, inventors of tools, and great soldiers, as favourably presided over by their respective spirits.

Modern Spiritualism, however, possesses little novelty. The Poltergeist has gone about for ages knocking and routing. Some of the ancient Vampires were Poltergeists, or knockers; and in Franconia, on St Thomas's Day, damsels go to a tree, knock thrice, and solemnly listen, for the indwelling spirit to answer by raps as to the husband they are to have. As for binding and loosing the crafty Ulysses, on board the Thesprotian ship, is a very ancient example:—

> "Me on the well-benched vessel strongly bound,
> They leave, and snatch their meal upon the beach:
> But to my help the gods themselves unwound
> My cords with ease, though firmly twisted round."

As to Turning of Tables, "John Bull," of the 16th Century, "Interlude Concerning Nature," writes—

> "I can make stoles to daunce,
> And earthen pots to praunce,
> That none shall them enhaunce,
> And do but cast my glove."

As to rising and floating in the air, it is a reproduction of the ancient Indian marvel. Men and women rose and floated in the air without any visible support.

In fact, the old heathen practice of divination is partially revived; that which God's Word denounces under the terms—witchcraft, sorcery, necromancy, seeking evil spirits, consulting the dead, is again amongst us as "Spiritualism, or the art of acquiring supernatural information by communication with the unseen and spiritual world." Men, instead of seeking God, inquire of spirits who, if spirits at all, are lying spirits. It is not likely that holy beings should come from "the presence of the Lord," to twitch and toss, to crawl under a table, break crockery, ring bells, and scrawl bad writing with worse spelling. Undoubtedly, men of weak nerves, of shaken and perverted intellect, are liable to a fascination, about consultation with the spirits of the dead, which deludes while it destroys. Yielding to this fascination throws down those mental and spiritual barriers which are the natural safeguard against such revolting pursuits.

That we stand in awful nearness to mysterious beings we fully believe; the warnings of Scripture are not against unrealities. The Magicians of Egypt possessed divination —not unreal, but wicked. The Witch of Endor answers to mediums of less power in the present day, and, possibly, brought up spirits of the dead. The coming of Samuel seems to have been contrary to her wish and despite her power. We may regard it as the appearance of a holy one whom she could not control. Manasseh, one of the most wicked kings of Judah, used enchantments, and dealt with familiar spirits (2 Chr. xxxiii. 6). The Damsel of Philippi was certainly possessed with a spirit of divination—deluding the whole city, and perverting her own intellect: when the spirit came out of her she ceased to be a medium (Acts xvi. 16-18). The seven sons of Sceva were exorcists, and the man by whom they were assaulted was more than a maniac (Acts xix. 14-16). Elymas was a sorcerer, and Simon Magus was Simon the Magician (Acts viii. 9; xiii. 6-11). These examples, and the manifold cases of demoniac possession, prove that there were spiritualists in ancient time and that wicked spirits had fellowship with men and controlled them.

Modern spiritualists are not all wicked like the old deceivers and necromancers. Most of them are victims of

delusion; the others, in professing to be mediums of supernatural influence from the spiritual world, do, either in pretence or reality, as did the Witch of Endor, consult familiar spirits; or are victims as the Damsel at Philippi; or as the mediums generally who gave responses in the oracles of the ancient heathen world. These modern departings from the faith, in a revival of diabolical arts, indicate the times when men will give heed to seducing spirits and doctrines of devils, or demons (1 Tim. iv. 1); and, like Jannes and Jambres, resist the truth (2 Tim. iii. 8). Various other portions of Scripture (Matt. xxiv. 24; 2 Cor. xi. 14; 2 Thess. ii. 8-10; Rev. xvi. 14) are equally clear. Turning to the Old Testament (2 Kings xvii. 17, 18; Deut. xviii. 9-12; Lev. xx. 6), it is not necessary to multiply references: for this working of Satan, with signs and lying wonders, is reckoned as the wickedness of adulterers and murderers, and the deceivableness of them that perish—a work of darkness; not because it attempts to foretell, to trace the inner connection of things, that may be a high aim; but because it levels those barriers by which our spiritual consciousness is guarded, and leads to unhallowed fellowship.

The Invisible World is revealed for a very different purpose: that we may know of the reaping that follows our present sowing, that we may have fellowship with God, partake of His Divine Nature through the Incarnation of Christ, and be personally holy by operation of the Holy Ghost.

The New Jerusalem is as a city in that kingdom, spiritual gold paves its streets, and around the safe and blissful homes are a defence as of jasper walls. Earth holds no such city; nor sea such pearls, nor caverns the rubies and diamonds, that shall adorn the inhabitants of Heaven; and so many are the great men there that we shall know more of them than we do on earth. It is true that, here on earth, the leaves of every forest, the flowers of every garden, and the waters of every rivulet, contain worlds teeming with life; and we learn from them that, beyond and above all that is visible, are fields of creation immeasurably vast and gloriously beautiful. When the curtain that hides them from view is drawn aside,

we shall behold more wonders than astronomy has unfolded; and find that, as a universe may be contained in the compass of a point, our wonder-working God fills infinitude with so majestic a mechanism of worlds that the evidences of His glory may afford us, in their study, eternal blissful occupation.

STUDY XX.

VARIETY IN NATURE.

"See God's hand in all things. . . . believe that things are not set in such inevitable order, but that God often changeth it according as He sees fit."—GEORGE HERBERT.

"To a clear eye the smallest fact is a window through which the Infinite may be seen."

THE general invariability of natural law must be taken as a fundamental fact without which no scientific interpretation of nature is possible. The same things will always happen under the same conditions. If gravitation acted sometimes at one angle, sometimes at another, instead of pulling in a straight line, the cry of "stand from under," would be a delusion and a snare. The most hidden and unaccountable movements, the fitful agitations of the weather, the waving of every leaf, the number of drops in a shower, and the shaping of clouds, are by a rule so wise and strong, that error, chance, or mischance, can never enter.

This natural uniformity is sometimes made to appear—not an order laid down by Infinite Wisdom for beneficent and effectual rule, but a chain of fate, blindly, rigorously, invariably binding all things with iron links of necessity. We agree with Mr. John Stuart Mill, that next to the greatness of the cosmic forces, the quality which most forcibly strikes one is their recklessness—they go straight to their end without regarding what or whom they crush on the road; but enlarged consideration shows that this seeming recklessness is beneficent, by calling upon intelligence to provide safeguards and remedies. It, in fact, enables the will of man to count for something in the world.

The uniformity of nature and the invariability of law are

not rightly understood, nor well interpreted, unless we know and act upon them as a platform for infinite variety. Laws are conservative, yet the untiring agents of change; and the ever-varying conditions of time, place, and material combination, render it certain that no two series of phenomena can ever be absolutely the same. If, on the one side, a man maintains law is uniform and universal; he may be met, on the other side, with the fact that it incloses infinite diversity and a series of surprises. Out of darkness we extract most brilliant light, and white light is analysed into all the colours. Who, looking at the field in winter, would predict, were it not for experience, the fruitfulness and glow of harvest? What man is able to prophecy why and how the caterpillar has a resurrection life of winged beauty? why and how the seed attains development in herb and flower, in shrub or tree? Nature is not one-sided, but all-sided. The student of physics carries the light of his private intelligence only a little way, and on one line, into the dark by which knowledge is surrounded; but nature faces us on all sides, carries on her work centripetally, centrifugally, and circularly, ever extending into wider regions of the all-embracing. What seem the wildest meteors of our imagination are sometimes proved to be brightest flashes of thought—with counterpart in the world of fact. Intellectual penetration of surrounding darkness, depends not so much on method as on spiritual insight; and the force carrying furthest is that of genius in the investigator. Our experiments constitute a body, of which purified intuitions are, as it were, the soul; "we can also magnify, diminish, qualify, and combine experiences, so as to render them fit for purposes entirely new." [1]

This view of diversity renders it possible to establish conformity between the Scientific idea of Law, and the Theological idea of Will—Will exerting itself with a fixed purpose according to a predetermined plan. Of that plan, Revelation furnishes the moral scheme; and Science seeks to unravel the physical process. Divine actions are based on unerring knowledge as to the future; and creation, begun upon a plan, is sustained and governed by an all-embracing Providence.

[1] "Scientific Materialism:" John Tyndall, LL.D., F.R.S.

It is evident that if Foreknowledge be Infinite, if Power be Almighty, and if Goodness be All-pervading, the Law or Rule will be so far perfect as to render any subsequent correction unnecessary—unless the action of free beings necessitates interference: all-provident and infinite Wisdom neither requiring nor allowing break or irregularity. Scientific men are so sure that the universe is the work of Intelligence, to be understood by intelligence, that they make their study an honest endeavour to unravel the laws which Wisdom has impressed upon matter. They find, or seem to find, a reason and purpose somewhat similar to, but infinitely greater than that which human intelligence could project, weaving the weft and warp of history with idea. The initial passage from the ideal to the actual being that moment of interference in which Nature began to realise and express Supreme Thought. This Thought embraces in one vast scheme all worlds, all time, and everything contained in them; and insures the liberty and responsibility of intelligent creatures by providing that means for interference and those agencies for readjustment which the good and evil wills of free intelligent responsible beings render necessary.

Our conception that natural uniformity is a chamber in which Divine Will displays variety, may be carried further. The unexpected conclusion has been drawn from certain recondite investigations that more than three dimensions in space are possible. In the career of the solar system we may be passing to regions in which space has not precisely the same proportions that we find here—where something will necessitate "a fourth dimension form of matter" for adaptation to the new locality. Nature, such as we know, possibly does not include all times, places and things. That which now concerns men, forming the natural parts of their experiences and analogies, may be but a small part of the Almighty's infinite dominions. Hence, when we are told of natural uniformity and invariability of law, we accept the statement, but confine it within the limits of our own experience; for that which seems utterly impossible here may be natural parts of other experiences and analogies. Consequently, that pre-arrangement which provides for every eclipse

of the sun, and occultation of a star; and which the government of free, intelligent, and responsible creatures renders necessary; may weave into the world a loving, spiritual, elevating process by which purity, now chiefly ideal even in the holiest of men, shall ultimately become actual in all. If so, Inspiration, Prophecy, Miracles, Spirit-power, are as much parts of nature as is material and mechanical order.

Such a scheme of government, being the highest our minds can conceive, seems to be that of a great and good God. If, further, we think that free responsible creatures, forming an essential part in such government, are the most perfect creations of the Infinite, it becomes absolutely requisite for their happy existence, righteous and effective government, that freedom shall weave the web of existence and the Divine plan with a wonderful variety surpassing finite understanding.

We think the philosophical argument may be verified by experiment. As a beginning for examples of variety underlying "Natural Uniformity," and an illustration of the infinitely elastic medium enclosing what is called "Invariability of Law," take Matter.

It escapes not careful notice that the sixty-four various kinds of elements, though of a rigidly accurate mechanical base, geometrical figures lying at the bottom of the whole, are adapted to an infinity of complicate and various purposes. The dense elements are pervaded by those less dense. All solid bodies are penetrated by moisture, or by the gases, or by the imponderables—light, heat, electricity, magnetism. Fluids are pervious by fluids, and gases are traversed by gases. Sometimes the path is traced by expansion, by fusion, by active chemical affinities. At other times, the path is secret, and the manner of transit remains a mystery. The elements, being impelled, aided by electric and other forces, produce, what has been called, "Electro-vegetation;" and advance to the mysteries of vegetable and animal life. Hence, the world, as a material organism, might be reduced into sixty-four kinds of elementary atoms; and possibly, these atoms, though we cannot convert any one into another, were once in one formless diffused substance.

Now we arrive at a startling result. So far from the ele-

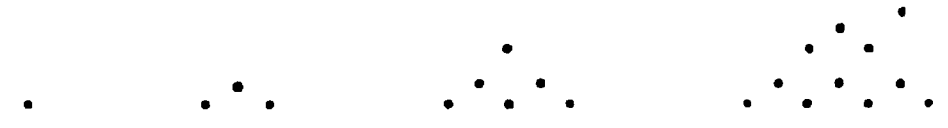
ments being somewhat inadequate, or all used in the many singularly contrasted substances and results exhibited in nature; only a few are largely present. As a mass, the outside contents of the globe consist of few elements: silicon, iron, aluminium, calcium, magnesium, potassium, sodium, hydrogen, oxygen, chlorine, and carbon. Animals and vegetables are varieties, chiefly of carbon, nitrogen, hydrogen, oxygen. The broad ocean, throughout its vast bulk, is narrowed to two elements—oxygen and hydrogen; other substances are indeed a small part of it. Considering that the human body, progressing to suitable form and fit use for the genius of Shakespeare, the imagination of Milton, and the piety of Wicklyff, is resolvable into a few elementary atoms; we discern that the band encircling natural uniformity and invariability of law is infinitely elastic.

It might be thought that the mathematical basis of the forms of matter necessitated such invariable procedure, and production of like by like, that the whole future could be calculated and formulated: whereas, Mr Babbage, in his ninth "Bridgewater Treatise," shows that we have no right to expect such invariable and fixed process. Deviations of the most startling character may co-exist with controlling law. A calculating machine can be constructed which, after working in a correct and orderly manner up to 100,000,001, then leaps; and, instead of continuing the chain of numbers unbroken, goes at once to 100,010,002, "The law which seemed at first to govern the series failed at the hundred million and second term. This term is larger than we expected by 10,000." The law thus changes:—

100,000,001.	100,100,005.
100,010,002.	100,150,006.
100,030,003.	100,210,007.
100,060,004.	100,280,008.

"For a hundred or even for a thousand terms, they continued to follow the new law relating to the triangular numbers; but after watching them for 2761 terms, we find this law fails of the 2762nd term. If we continue to observe, we shall discover another law then coming into action, which also is dependent, but in a different manner, on triangular numbers, called

triangular, because a number of points agreeing with their term may be placed in the form of a triangle, thus—



1, 3, 6, 10. This will continue through about 1430 terms, when a new law is again introduced over about 950 terms; and this too, like all its predecessors, fails, and gives place to other laws, which appear at different intervals."

It is evident that all calculations, beyond what serve for the immediate guidance of our life and practical reliance on nature's uniformity, may be and probably are subordinated to some higher law which, at various seasons, interrupts and changes it. How then can any philosopher assert—"There never has been, and never will be any intervention of natural laws?[1] There must have been an intervention, and a series of crises, on the formation of elements out of primeval atoms; grouping and giving them powers as solids, fluids, gases; combining the inorganic; organizing it; doing that which no chemist can—vitalise it; and building up the world in harmonious beauty. The development, whether by an almost infinitely extended process, or sharp, abrupt, absolute, is inexplicable, except by intervention of an Inscrutable power. During the historical era ordinary observation might discern no change, the procedure with which we are acquainted may have been uniform; but, in ages preceding, we know not what happened; nor can we, with certainty, forecast the future; the invisible and unknown are indisputably great factors in the universe. The smallest particles of any substance may belong to a vast number of systems, communicating with one another, and in a manner wholly incomprehensible.

We may think of it in various ways.

Well nigh infinite change has been wrought since our planet began. No part of the surface is now, or ever has been at rest. There is a constant change in life, solar radiance is ever gaining or losing in intensity, the density and moisture of the air are continually increasing or diminishing. Take the molecular theory of gases. The particles fly about with very great velocity,

[1] "Conflict Between Religion and Science:" Professor Draper.

impinge upon one another, and against the sides of the containing vessel, thus producing what we call the pressure of the gas. At ordinary pressure, every particle has to move a distance, say, of something like $\frac{1}{100,000}$th or $\frac{1}{100,000}$th part of an inch, on the average, before it comes in contact with another particle, and is sent on a new path. The pressure may be decreased by partially exhausting the gas, so that there are fewer particles in a given space; or, by compression bringing them so much closer that, on the average, the particles are not more, say, than $\frac{1}{100,000,000}$th part of an inch asunder. The average square of the velocity of the particles corresponds with the energy of heat in the gas or its temperature. When a gas is so far condensed as to approach the liquid state, its particles are scarcely ever free from collisions; in the solid state its particles are, practically, in a permanent state of collision one with another.[1]

We obtain by mathematical methods a faint conception of the complexity and mystery; for example: in a mass of hydrogen, at ordinary temperature and pressure, every particle has on an average 17,700,000,000 collisions per second with other particles; in every second its course is wholly changed 17,700,000,000 times; and the particle itself moves at the rate of 70 miles in a minute. In air the number of collisions is about half, and the velocity about one-fourth of that in hydrogen.[2] In a cubic inch of air, in the ordinary state of the atmosphere, the number of particles is approximately about 3×10^{20}, that is 3 with 20 cyphers after it; and the effective diameter of a particle is not very different from one 250,000,000th part of an inch.[3]

Careering amidst the tumult and storm, are minute living creatures hustling one another, or keeping out of one another's way, feeding, and propagating themselves; in every room, not myriads only, billions exist.

We are told that distilled water is homogeneous, and a germ of life is absolutely structureless, because the microscope fails to distinguish difference or structure; but, in reality,

[1] "Recent Advances in Physical Science," p. 245-247: P. G. Tait.
[2] "Recent Advances in Physical Science," p. 324: P. G. Tait.
[3] "Recent Advances in Physical Science," p. 317: P. G. Tait.

even the microscope is blind as to these things. What shall we say then to skyey particles, so infinitesimally small that the minutest "vibrios and bacteria of the microscopic field are as behemoth and leviathan?" The diamond and amethyst have structure, but no structure can be detected; particles of water, changed so as to be diamagnetically polar, twist a ray of light, yet present nothing for the microscope to reveal; and germs of life, which seem absolutely simple, possess a complexity transcending our comprehension as it surpasses our powers of observation.

We hardly have patience with men who, knowing the world to be thus mysterious and utterly incomprehensible, full of things baffling and transcending human intelligence at every step, tell us—"there never has been any Divine Interference." Why Divine Interference is continual—matter, life, intelligence, are as a garment of the Living God: shall He not move in it, lay it aside, or change it, as He sees fit? Commonest things manifest incomprehensible peculiarities. Take a cold highly polished plate of metal, place a wafer on it, breathe on the wafer: when the moisture has disappeared, and the wafer been thrown off, no trace of wafer or breath will be seen; but breathe again, and a spectral image of the wafer comes to view. Tried again, after many months, the shadowy form once more emerges—a symbol of life and resurrection from the dead.

The farina of flowers appears to the naked eye like simple dust, but when magnified it is seen to be finely constructed and of great variety, according to the character of the plant. Leaves are among the most delicate and gorgeous forms of nature. The leaf of the Box is supposed to have on its two sides 344,180 pores, and the back of a Rose-leaf is diapered as with silver. "The Crowberry of our moors (Empetrum nigrum) habitually exhibits a peculiar mode of variation in the arrangement of its leaves on different parts of the same twig. Out of fifty Crowberry twigs, taken at random, only four (and these fragments) preserved the same arrangement throughout. In the remaining forty-six the leaf arrangement was found to undergo a progressive change in ascending from the base of the twig to the summit—

a change from a simpler order to others more complex."[1] It seems that complex spiral leaf-order "is the result of condensation operating on some earlier and simpler order or orders, the successive stages of that condensation being ruled by the geometrical necessities of mutual accommodation among the leaves and axillary shoots under mutual pressure in the bud."[2] It is supposed that the original form of leaf-arrangement was two-ranked; that this two-ranked form gave rise to forms with 2, 3, 4, 5, 6, 7, &c., ranks by sporting; that of the orders so formed, those with an even number, except 2, became whorled; and those with 2 or an odd number assumed an alternate arrangement; and that all orders have been subject to vertical condensation under the need of vertical economy of space.[3]

Some consider that the sun is the only source of the energy exhibited in all vital actions. It is more correct to say that life is peculiar to organism; the sun not giving it, but stimulating and favouring. Yeast will increase indefinitely when grown in the dark; and there are organisms beneath two or three thousand fathoms of water, almost if not wholly deprived of light. Aided by solar influence, the structureless colourless life-fluid infinitely transforms itself, groups the transformations into molecules so marvellously that, though the life-wave in two consecutive moments is never composed of the same particles, similar living creatures are continually and unerringly produced: this germ proceeding to the plant, that to the animal; but both, while agreeing in general parallelism and analogy, developing into different and opposing forms of structure.

Some suppose that by means of electrical agency form is imparted to organisms, and that the leaves and twigs of plants all terminate in angles or sharp edges by electrical operation. Among Phanerogamous Plants a certain number of organs, either developed or rudimentary, is always present, and the

[1] "Leaf-Arrangement of the Crowberry. Proceedings of the Royal Society," 1876, No. 172. Hubert Airy, M.A., M.D.

[2] "Leaf-Arrangement of the Crowberry. Proceedings of the Royal Society," 1874, No. 152, p. 301. Hubert Airy, M.A., M.D.

[3] "Leaf-Arrangement of the Crowberry. Proceedings of the Royal Society," 1874, No. 152, p. 307. Hubert Airy, M.A., M.D.

rudimentary are capable of development. Flowers, bearing stamens on one stalk and pistils on another, can be made to produce both. Where and when a new function is required, nature provides—not a new organ—but a modification of the common one by metamorphism. Some plants, if transferred to the sea-shore, produce thick fleshy leaves, the same plants placed in a dry hot locality get thin hair leaves, and out of the wild acrid sloe have been produced our rich variety of plums, peaches, and nectarines. Individual peculiarities are more accurately transmitted by non-sexual than by sexual propagation. When, for instance, a tree with stiff and upright branches accidentally produces down-hanging branches, the gardener, as a rule, must obtain a weeping tree by planting cuttings or slips. Seedlings would generally have the stiff and upright form. A species of Aloe is said to blossom once in a century, and not less wonderful is a bamboo that grows among the hills in the south-east of Mysore. The natives report that it seeds once every sixty years, and the product, marvellously abundant, is called bamboo rice. In the husk it resembles cleansed paddy, but is more like wheat. It is sweet and palatable as food, and more satisfying than rice. The periodic falls of this great and spontaneous abundance attract to the region not only men, but a vast assemblage of rats, birds, deer, pigs, squirrels. The decay of the plants dates from their seeding, and they fall about three years afterwards; by which period the young bamboos, that have struck root around them, attain a height of eight or ten feet. He is a presumptuous and rash man who professing to know all about these varieties and sports of life, having at one end of the series something infinitesimally less than a tadpole and at the other end a man, can assert "there never has been any insertion of Creative Power."

We are fully warranted in considering that law, as applied to all phenomena within range of human observation, stands on an equal footing with the axioms of geometry itself; but as all phenomena are a continuity or extension of the invisible into the visible, and of the visible into the invisible, whatever we know is bounded by the greater unknown. We must ascend into that unknown, into the essences and inherent

constitution of things, to find the true cause. For example—the chemical composition and actual state of living matter is wholly unknown. It changes and dies as we try to analyse it; and the dead, not the living substance, is in our hand. It is probable that during the living state the elements are not in any ordinary chemical combination, that the causes of transformation reside in the lowest germs, and operate in every interval of time. The initial point, the start, is in all and everywhere absolutely the same: nevertheless, the organic energy must be essentially different. What surprises, variety of results, differences of structure, and of functions, are contained in carbon, hydrogen, oxygen, nitrogen, those four elements of the living creature! Where man finds neither distinction nor difference, a great gulf is fixed which may not be passed. Where man finds invariable uniformity, there inscrutable energy works infinite variety. From a kindred close as of one family, emerge creatures which, as plants, are perfected in the tree; and, as animals, are glorified in man.

> "The greatest wonder
> Is, that to us the real true wonders can
> Become so common place, and must become so."
>
> LESSING.

Offspring resemble their parents, but the similarity never amounts to absolute identity either in body or mind. The tendency to general likeness is constantly checked by an impulse leading to variety. Brothers and sisters, children of the same parents, are unequal from their birth. Many animals produce several young ones at a time; but all those young differ in size, colour, strength. Some divergences of child-organism are so great and striking as to be monstrous. There are no two individuals which can complete their life under quite the same external or internal conditions; and the difference first affects the functions, and then affects the form of the organism. On the same field depasture the sheep, the horse, the bird; but one turns his nourishment into wool, another into hair, the third into feathers: who knows how or why? To Pericles were born Paralus and Xanthippus; just Aristides produced the infamous Lysimachus; Thucydides, the powerful-minded, was represented

by the idiotic Milesias and the stupid Stephanos. What a difference separated Oliver Cromwell from his son Richard! Who cares for the children of Shakespeare, or regards the daughters of Milton? The only son of Addison was—an idiot.

Evidently an unknown law does, notwithstanding, establish heredity. We talk of the wit of the Montemarts and of the Sheridans. Many celebrated fathers have sons of renown: the two Herschels, the two Colmans, the Kemble family, the Coleridges, and Sebastian Bach's musical genius descended to three hundred of his race. These are cases of transmission.

The power of an organised germ to unfold into a complex adult, and repeat ancestral details in the minutest traits, even when placed in conditions unlike those of its ancestors, is a capacity we cannot yet understand. A microscopic portion of seemingly structureless matter contains such an influence that the resulting man shall, fifty years after, become gouty or insane. In the higher animals, every separate organ is a manifold structure, every organism is a complication of related organs, the whole having many relations to the internal and external worlds. Were changes made by blind fortuity, the chances against any permanent improvement would be as those attending the production of Milton's poem, "Paradise Lost," from the fortuitous upsetting of a box of unassorted type.

Until the year 1824, it was thought that the blood of every animal took one definite and invariable direction. In that year, M. von Haselt, happening to examine a little animal, the Ascidian, found that the heart, after beating a certain number of times, stopped, and then began to beat the opposite way, reversing the course of the current. Professor Huxley says—"I have myself timed the heart of these little animals. I found it as regular as possible in its periods of reversal, and I know no spectacle in the animal kingdom more wonderful than that which it represents—all the more wonderful that to this day it remains an unique fact, peculiar to this class among the whole animated world."

Uniformity is evidently the floor of Nature's Workshop, for the tools and mechanisms prove that variety is aimed at as a beauty. Coral—formerly counted a sea-weed, which had

the singular property of becoming hard when brought up from native depths into contact with the air—we know to be an animal, with stem and branches, and fixed to the soil. "It is a sort of natural co-operative store," one that buds and divides, a living thing laying numerous eggs. The young, coming forth from the eggs, have no resemblance to their parents, swim about until, having lost their cilia or hair-like filaments, they settle down in the sea bottom, or become fixed to the rock, and grow up like their parents. Here is a plant —no—an animal; the young go forth unlike their parents, in infancy, volatile; but, finding discretion betimes, build upon a rock. Other creatures have no infancy at all.

Birds of passage, without chart or compass, find their path across the sea, even to a place six thousand miles away, for suitable food. True as the needle to the pole, are these birds to their right place and at the right time. Gallinaceous fowl are, even at the first, equipped with instinct, and their bodies are clothed with feathers, yet not like the adult.

The fishes, Helmicthyidæ, have such clear crystalline bodies that the words of a book may be read through them. Fishes have no voice, yet that fish, the Amia, grunts in disapproval of the doctrine, "Nature in all things is uniform." Sundry of them, for no very obvious reason, ramble about on land, and one kind of fish climbs trees, and the squirting fish shoots drops of water at its prey, and seldom misses making booty of it. The Perca Scandens, a fish, is sometimes found scaling rocks, climbing bushes, and ascending trees. Mud-fish bury themselves, and remain dormant till the rains of the wet season set them free.

Those synthetic types which comprehend in one the properties of several groups of life, and those embryonic changes by which the young both of plants and animals pass through comprehensive stages of existence belonging to other creatures, prove that there are wonderful physical and organic changes strangely connected with some vastness which escapes us on every side. There intervene a series of intermediate agencies of which we have no knowledge, not a simple uniformity, but often a surprise, and the genesis of an atom is not easier to conceive than the genesis of a planet. Science,

far from making the universe a less mystery, makes it a greater mystery; and Creation is proved not to be mechanical —a man may put together a machine, but not a machine that shall develop itself—it is that wonderful process by which formless diffused matter was raised into the present universe and filled with life. The variety of operation is infinite.

The fact that the embryos of all animals, apparently not different, are really different, is proved; for if the mammal throws off its embryo with heart in two chambered or fish form, it does not live; or in the three chambered reptile form, it does not live; nor though the brain of a child passes through the lower forms, is it at any time any other than the brain of a human being. Every organic structure is not merely a thing conditioned by circumstances for circumstances; but passes beyond and above circumstances into the peculiarities of special and unaccountable conditions.

This variety of life's rhythm may be illustrated by light and sound. They are undulations of an elastic medium, simply wave-movement: the sounding body exciting undulations in the air, luminous and heated bodies exciting undulations in the æther. Owing to the differences of the media, the sound waves are longitudinal, those of light are transverse the course of direction. By differences, far more minute than those which separate light from sound, some life is limited to a monad—compared with which a grain of sand is an earth; other life is complicated and perfected in those functions of man which require cyclopædias to describe, and are able to explore that universe in comparison with which our earth is a grain of sand.

There are oddest eccentricities. Porcupine men of the Lambert family, covered with thorn-shaped horny substance projecting more than an inch. Six-fingered and six-toed people, as the famous Spanish family of no less than forty individuals. Descend to smaller creatures—The Hyrax (coney of Scripture) is like a rabbit, but with strange divided hoof, miniature of the Rhinoceros' hoof. The Rotifera, despite complex structure and aquatic habits, can be dried; and again brought to life by the addition of a

little water. This wetting and drying, dying without death, can be repeated many times without killing. The Frog is the only creature that has a calf like a man. In ordinary Mammals the milk is obtained by voluntary suction on the part of the young, but in the Marsupials (Kangaroos, Opposums, etc.) the milk is forced into the mouth of the young animal by the action of a special muscle. Plants grow up, as into animals; and there is a lowering of some animals, as into plants. We find an intelligence, well-nigh human, in the beast; there is scarcely anything which we would not believe of the dog; and, at times, the human becomes more inhuman than the beast. The Æthalium septicum, appearing upon decaying vegetables, is a fungus; yet the Æthalium, in another condition, is a moving creature, and takes in solid matter as food. The Venus Fly-trap is an insectivorous plant, laying traps for insects, squeezing them to death, and devouring or dissolving their substance for nourishment. The Drosera plant digests animal food. Life's variations combine in forms so strange, habits so various, contradictory, startling, and unaccountable, but of ordered plan, as transcend all our philosophy.

Examples of eccentricity may be continued to any extent. There is no reason in the nature of things why creatures covered with feathers should always have beaks, yet it seems they do, and the Penguin has feathers somewhat scale-like. A certain Actinia keeps house on the hermit-crab. The creature goes with that crab to share the prey, and even snatches morsels that its companion is eating. Water does not seem a good medium for a fly, yet more than one species live beneath the surface—coming up only occasionally for air. Red clover could not exist without the humming bee; which, in sucking the honey, brings the pollen in contact with the stigma and so the flower is fructified. How Red clover began to be Red clover without the Bee we do not know, nor how it could be produced by "a mechanical relation acting unconsciously."

You cannot continue the perfect equilibrium of a pair of scales; eventually one scale will descend, the other ascend. Water, however kept, will inevitably become of unequal den-

sity and consequent currents. Heated matters soon become different in their outer and inner parts. All masses assume heterogeneity by action of various forces. All these things are essentially strange as the sudden combustion of stars; and all natural principles and modes of life are open to some degree of irregularity, gathering exceptive cases around uniformity. Silence may be produced by intersecting waves of sound. Flames are made musical, and dance to sounds for hours. Few people know that the only objects which they see single are those at which they look directly; all others, behind or before these, appear double. Who has found the blind spot in his eye?

These strange anomalies, and yet stranger still, subject to strictest law, are as nothing to the fact, that though we connect our sensations with the things producing them, no kind nor degree of similarity exists between the quality of a sensation, and the quality of an agent inducing it and portrayed by it. The facts of consciousness present a class of phenomena whose connection with physics Prof. Tyndall declares to be "unthinkable," a chasm, "which must ever remain intellectually impassable," separating them; therefore, though the material basis of life may be argued for, life can never be proved mechanical in its essence; and in thinking of the mind we place ourselves outside the world of space, nor can we think of it unless we do; and a faculty of living apart, of acting with or without the body, is ascribed to the mind. Even if we do not admit all this, when we speak of a mental act, we have always a cause with two faces: the effect is not merely produced by the mind, but by mind joined with the body. The construction of the sentient and the imaginative principle reveal a universe of elaborate structure, replete with life, in which our intelligence and honourable condition are facts real as any other.

As to Varieties in Reproduction, some animals are sexual, others are non-sexual; some, strange to say, are sexual at one time, and non-sexual at another; others combine the two sexes in one individual, and others bring forth in a virgin-state. One creature, the reproductive zoöid, or jelly-fish, has been known to attain a size of seven feet across, with tentacles

fifty feet in length, though the fixed organism from which it sprang was no more than half-an-inch in height. With regard to the Water-flea (Daphnia pulex) it seems a well-established fact that the female, when once fertilised by the male, not only lays eggs for the rest of her life, but can transmit the power of producing fertile ova to her young for several generations. Among certain lower animals and plants there are alternations of generations (metagenesis). The Salpæ, which float on the surface of the sea, have the first, third, and fifth generations alike; but unlike these, yet like one another, are the second, fourth, and sixth generations. All breeders of animals know that occasionally by reversion, or "atavism," individual animals assume a form which has not existed for many generations. There is no known law concerning this relapse to a more ancient type.

The Tape-worm is hermaphrodite in every generative joint, and contains innumerable ova. Variety not only distinguishes things which are lovely, making them yet more beautiful; it acts as a warning that we be clean. Repulsive things in endless variety of disgusting existence are symbols of those low and vile among men who defile the very course of nature; whose life seems "like a mocking travesty wrought in the dark by an impish finger." The strangest part of all is, that these bad cannot live but by means of the good, by means of those who are of nobler nature; evil, in itself, being only destructive. Examples are afforded by these entozoa. The ova of tape-worms cannot live unless they are swallowed and nourished by a pig. For further development they must enter the alimentary canal of man. If a portion of measly pork be eaten it becomes an adult tapeworm in the human stomach. Another tapeworm of man is developed from the measles of the ox. A kind of tapeworm, found in the stickleback, is barren; but if the stickleback be eaten by a water-fowl, the worm lives and reproduces after its kind. There is a tapeworm in the mouse, and it remains infertile; but if a cat eat the mouse the worm lives and multiplies. The tapeworm of the fox comes from the cystic worm of hares and rabbits. The disease Hydatids in men is caused by cystic worms, which are ultimately developed into the tapeworm of the dog.

The cod-fish spawns its million of small ova and leaves them without protection. The Hippocampus, or Pipe-fish, has its fewer large ova carried about by the male in a caudal pouch, or hemispherical pit in its skin. The Arius Boakeii—a fish six or seven inches long, produces ten or twelve eggs, large as marbles, which the male carries in his mouth till they are hatched. After building a nest the male Stickleback guards the eggs; the great Siluris glanis does the same for some forty days, in which he takes no food, until the eggs are hatched.

The males of all creatures are generally larger than the females, but some females, as the parasite, Sphærularia Bombi, are a thousand or many thousand times larger than the male. In all this, the eye sees what it brings the power to see; but intelligent men ought to perceive that instinct and laws of nature are not an immutable fate, but act in a plastic medium, drawing complication out of existing elements, ever bringing a new message concerning new issues, revealing new ways for attainment of new purposes, and awaking

"Sense sublime
Of something far more deeply interfused."

Among Bees the queen is universal mother. The males or drones are produced at certain seasons; neuters, or sterile females (workers), are the ordinary production. These workers procure food, build the nests, feed the young, and fight for the community. They can so modify a larva which would result in a worker that it shall be a queen. They enlarge its cell, make it assume vertical instead of horizontal position, keep it warm, and feed it with queenly food. The queen requires sixteen days for development, the workers twenty-one, the drone twenty-five. Not only bodily organization but their psychical nature is essentially altered by nurture.

Ants form communities of males, females, and workers. The males and females are born with wings, soon after fly away, but in a little while the females cut off their wings, and settle down to be careful and steady housekeepers, laying their eggs during the first five days of the year. The workers take wonderful care of the eggs, place them in special chambers,

every now and then lick them, and alternately carry them to the upper and lower stories of the nest to keep them at due temperature. When hatched the little vermiform larvæ cannot move, but have instinct to raise the head and open the mouth, into which their nurses put the food, feeding them like little birds and cleaning them by a rub over with their palpi. When the larvæ are full grown they spin a silky oval cocoon. When the metamorphosis is completed, the ant is too weak to tear open the silk of its cocoon, and would actually perish—a prisoner, were it not for the vigilance of the workers. These, using their mandibles, set it free, nourish it, and lead it all over the nest introducing it to new life.

The red ants, *Formica sanguinea*, enslave other ants. Huber describes a curious scene which he saw in 1804 near Geneva. A great mass of large ants of reddish colour crossed a road with great rapidity, marching in a body from eight to ten feet in length by three or four inches in breadth. They pierced a thick hedge, moved on to and over a grass field in regular array for about twenty yards and there arrived at a nest of blackish ants. Those about the door gave an alarm and attacked the invaders, while a host rushed from within; but the red ants thrust the black ones back into the nest, clambered the dome, some forcing a way into the large avenues, while others worked with their mandibles to open a breach in the walls, by which the invading army entered. In three or four minutes the red ants came out again quickly, every one holding between its mandibles a larva or nymph, and bore it home. This was a clear case of slave-making. It is a wonderful instinct that causes these—which cannot work the soil, nor construct underground edifices, nor nourish their own larvæ—thus to capture and enslave the nymphs and larvæ of workers from the nests of other species; which, so soon as they have completed their metamorphosis, build cells and feed the larvæ of their captors.

Some ants are sure to be found on the plants crowded with Aphidæ: not to harm, but rub them gently with their antennæ; then the Aphidæ, apparently pleased, distil a little drop of sugary liquid which the ants sip up—using the Aphidæ as cows. Hundreds of observations prove that these indus-

trious creatures communicate with and understand one another. They may be seen to stop, and touch one another with their antennæ, which seem to be special organs of a peculiar insect language. Wounded brethren are helped, led to the nest, operations are conducted, and battles are fought in military array. There is no doubt as to ants milking the Aphidæ by tapping them with their antennæ.

The Aphidæ themselves present curious and interesting facts. The males have large wings, but nearly all the females are without wings. In autumn their eggs are laid on plants; hatched in the spring, not as caterpillars, or grubs, but imperfect Aphidæ, all females. These females are the mothers of millions and millions exactly like themselves—females and wingless—to nine or ten generations. Then the last generation does not produce its like, but perfect males and females with wings, which lay eggs in autumn to be hatched in spring. Only the first generation of imperfect females is hatched from eggs, all the rest are born alive at the rate of three, four, or seven a-day; but the last generation have inside buds which, when born, are not like their mothers, but resemble the parents which laid eggs the year before. This anomalous system of reproduction is known as parthogenesis, breaking the rule—that like produces like.

The glories of the perfect insect are not marked in the tiny grub. Important organs, and new combinations of structure for peculiar functions, are added and shaped by the unknown energy of growth and metamorphosis. The parts of an adult are not on a small scale in the creature as it escapes from the egg; they can no more be found than our own soul, or inner man, the angel part, is discovered by anatomical research and post-mortem dissection. Some insects, like grasshoppers, change their skins several times during growth; and there are changes inside the egg, and moultings and metamorphoses outside during the history of most of the articulata. Some change so greatly as to become wholly different creatures, others submit but to slight changes of shape and structure. Things very similar end in differences most striking; nevertheless, between the immature and adult forms anatomy discovers close resemblance. The lobster and the prawn, for

example, are closely allied by similarity of construction; but the former changes little, the latter presents three forms before attaining the mature beauty of prawn life. The Death's-Head Moth possesses the power of squeaking.

The caterpillars, *Attacus acropia*, from Louisiana, at first nearly black, decorated with hairs, look like little hedgehogs. Moulting, they become grey-green or russet in colour, all the tubercles or spines brilliantly black. Again moulting, they are bright green, with five rows of black spots; two magnificent tubercles of a carmine colour are on the second and third segments, and two of light yellow are on the dorsal part of every other segment. At a third moult, the body is azure blue on the back, with black spots on the sides and head; the tubercles form two rows on the back, are red and much enlarged; the other tubercles have a single spine upon them. At the last moult, the caterpillar is of a pale green colour, all the lateral tubercles are light green, the red tubercles have taken an orange tint and have only one spine. Then it forms a double cocoon—the outside hard and like parchment in texture, the interior silky—where it is transformed into the moth.[1]

Some caterpillars fast for nine months; larvæ of the next kind eat and grow big; there is more in the philosophy of this than we know: metamorphosis is not determined by simple physical influences, it often refers back to ancestral peculiarities. The processional caterpillars go forth under a leader to their food, and return in the same array, yet nothing distinguishes the leader from the others. Caterpillars, much alike, become moths which present marked distinctions; and moths, which resemble one another, proceed from very dissimilar caterpillars. Metamorphoses are generally an advance, but the female winter moth, *Climata brumata*, and Psyche, positively retrograde; the male advances, has wings, but the female is without even the moving power of the caterpillar: whereas, the female Nemoura are perfectly developed as winged flies; but the wings of the males are rudimentary and short. Of a moth, the *Psyche helix*, we only know the female; the virgin females lay eggs which become perfect females. In

[1] "Transformations of Insects," p. 111 : Dr Duncan.

like manner, isolated female wasps give birth to eggs which turn to females, no males; which again produce their like.[1]

The Hymenoptera, most highly endowed of all insects, are in an early stage most helpless; the larvæ of ants, for example, must have the food put into their mouths. The instinct, or sense of hearing or of smell, that enables the parasitic Hymenoptera to discover a larva inside a fruit, or within a branch or trunk of a tree, and perfectly out of sight, makes us wonder. Some non-carnivorous insects hunt and catch prey for their carnivorous young; then stupify the prey so that it may remain alive, even for months, but in helpless state, for the young to feed on. All known Beetles lay eggs, but in 1864 Schiödte discovered that the Staphylinidæ produced living larvæ. All the Myriapods respire by agency of tracheæ, but Sir John Lubbock has described a curious little myriapod, Pauropus, which he says has a look of cheerful intelligence, no tracheæ, and respires, he supposes, through the skin. All these varieties, of which natural uniformity is the theatre for display, are indications of a mysterious energy working in particular ways, adjusting inner and outer relations; and, however elevated and complicated the result, it is wrought by means of the simplest elements, and generally by insensible degrees.

The smallest amount of intelligence requires perfect organization: but mechanical appliances, implements, tools, necessary to produce good work, do not convey intelligence, though they may be called its mechanical basis. Nature seems to have a purpose in everything, and does work as knowing how to do it, though the purposeless or "silent members" in animal frames are hard to account for. Some animals have teeth, never meant to eat with; there are rudiments of toes in a horse, and teats in male animals, utterly useless. Are we thence to infer that eyes are not meant to see with; nor feet to walk with; nor teeth to eat with; nor was "a duck expressly intended to be a duck with a web-foot, that it might pleasantly move on the water; but its forefathers and mothers a long way back began, under pressing circumstances, to get a duckish disposition; and by dint of endeavour for ages to

[1] "Transformations of Insects," pp. 158, 238: Dr Duncan.

try their chance of paddling themselves about on the pools of a puddly world, their efforts were at length rewarded, and resulted in a complete success—so remarkable indeed, at last, that a generation sprang from them thoroughly equipped for the waters with web-feet, oily back, boat-shaped bodies, spoony bills, and bowels to correspond with mudworms and duckweed." [1] Surely it is time to lay aside notions so grotesque, and to live, as did Newton and Boyle, in the conception that

> "God dwells within, and moves the world and moulds,
> Himself and Nature in one form enfolds."
>
> GOETHE.

If not able to assign a purpose for purposeless structures we are less able to account for them as a natural selection: they would be an unnatural selection. It is inconceivable that any creature could or would voluntarily grow them; nor can we credit that any brute is able to make an intelligent attempt to become intelligent. It is incredible that nature would put swiftness from the feet, fangs from the mouth, claws from the paws, and cast aside the acute sense of smell, in order to advance in life; or that any intelligent creature would divest itself of those advantages. As for time and space they are not structural causes, and could never enable any brute to generate a progeny that would submit to conditions of moral responsibility. If, however, we consider that "silent members" were of use in the past, or are for use in the future; that there is in nature an agency of use and disuse; light begins to shine in the darkness. Rudimentary organs will then show somewhat of the stages by which old forms die out and new forms come in: by modifications acting through generations of ancestral organisms. If not, there is another explanation:—The finished and complicated parts of our most wonderful machinery are all found typified in simpler shape, and narrower use in smaller or in primitive engines: so the imperfect organs of lower animals become perfect in higher creatures. In like manner, the human mind is a real though faint emblem of the Wisdom of which

[1] "The First Man and His Place in Creation," p. 36: Geo. Moore, M.D.

all natural phenomena are manifestations. We have a sketch, in ourselves, of the detail and plan which are worked up into the universal fabric: the lower anticipating the higher, and the higher fulfilling that anticipation.

The battle of life, therefore, through all time and in every field represents an unseen influence but visible in effect, taking away the feeble from an unequal contest, laying aside the lame if they cannot be made to walk, and carrying off the blind if they cannot be made to see; that the strong, the swift, the clear-sighted, may attain perfection. Butler's comparison may be true, that waste of seeds, like waste of souls, is a condition of psychic and organic progress; an analogue of selection carried out in the spiritual world. "Life is not a bully who swaggers out into the open universe, upsetting the laws of energy in all directions, but rather a consummate strategist, who, sitting in his secret chamber over his wires, directs the movements of a great army,"[1] and leads his forces to possess the worlds.

We pass now from Varieties in Life to the Manifold Changes of Inorganic Matter.

Chemistry is the science of experimental surprises. The most inert substances often producing, by combination, compounds of the strongest energy; the tasteless becoming intensely sour, sweet, or bitter; water, that quenches fire, containing the elements of fire; and the things which give and gladden life turning into demons of destruction. Many mineral, vegetable, and animal poisons, having apparently little in common, produce the same effect on the muscles as heat. The chemical union of different kinds of atoms, in the definite proportions of whole numbers, entirely changes their characters and properties. Two different liquids often condense into a solid; and the result of the chemical combination of two various gases or vapours, in quantitive proportions, may be solid, liquid, or aeriform. The ingredients of that acrid, dangerous, corrosive liquid, aquafortis, in different proportions, are constituents of the summer breeze. Another affinity of our atmosphere produces "laughing gas." More surprising, there are compound substances absolutely identi-

[1] "The Unseen Universe."

cal in the number and relative proportions of elements which in colour, odour, taste, are wholly unlike. The same substance will act as an acid in one combination, and as a base in another. Indeed, chemical laws seem imperfectly stated cases of some more general law of combination.

A piece of sugar falls into water, and sinks by law of gravity; but in a little while, it is found to have ascended and sweetened the whole. The same happens with salt, alum, and various other substances; yet, oil poured on the water will not diffuse itself through the mass; and gases of different densities put into a vessel will not, according to gravity, take different levels; but, by the law of diffusion, commingle.

Every different body requires a different quantity of heat to produce in it the same change of temperature; and the volume of most substances increases continuously as the temperature rises; but there is at least one exception among solid bodies—Iodide of Silver. The three principal states in which matter is found are the solid, the liquid, the gaseous; but most substances, probably all, are capable of existing in every one of these states; and the solid, passing into the liquid, is actually hotter than the liquid—the surplus heat is called latent. There is generally a change of bulk in the act of fusion; some expand, some diminish, we know not why. Ice dissolves into water of less bulk, but most substances enlarge. It requires more heat at high than low temperature to warm liquid one degree. Most liquids contract with cold, but water expands from 39° F. to 32° F., and then contracts. A glacier moves slowly on like a viscous body, an india-rubber band suddenly stretched out becomes warmer, if you pull out a steel spring it becomes colder. The conversion of liquid into vapour requires an amount of latent heat which is generally much greater than the latent heat of fusion of the same substance, and when a gas is near its point of condensation, its density increases more rapidly than the pressure. When it is at the point of condensation, the slightest increase of pressure condenses the whole into liquid, which seems contrary to the law—"the pressure of a gas is proportional to its density." In the liquid form the density increases very slowly

with the pressure. When temperature has attained a certain point, the properties of a liquid and those of the vapour continually approach to similarity, and above a certain temperature the properties of a liquid are not separated from those of a vapour by any apparent difference between them. Hence, the gaseous and liquid states are only widely separated forms of the same condition of matter, and pass into each other without any interruption or breach of continuity. In one way you can see this, in another you cannot. Begin, for example, with water: take this path B, a, A; return by A, a, B. We begin with water at B, we have water and saturated steam about a, then superheated steam till we reach A. On our way back we have no such stages—though when we reach B there is water as at first.[1]

Potassium and sodium are somewhat remarkable: these metals are near akin in their specific gravities, their atomic weights, their chemical affinities, and the properties of their compounds. Potassium melts at 136°, sodium at 19°, but the alloy or mixture of the two is liquid at the ordinary temperature of the air. Cold is made to exist amidst hottest fire, and ice may be taken from a burning crucible. These are facts which only experiment could discover, and can only be reduced to law by a formula which includes both the usual course and the apparent exception. Observe more particularly as to water: when in contact with ice it cannot be cooled below zero without being converted into ice. In heating the water the ice melts, but the temperature of the mixture is never raised above 0° so long as the ice remains unmelted. Hence, the water contains a greater quantity of heat at 0° than ice contains at 0°, and gives up its heat to become ice. We do not know what becomes of this heat—nor how to account for the fact that water at 0° is not ice, and that ice at 0° is not water.

Physicists state that changes in consciousness are correlated with molecular motions of nerve matter, which are highly differentiated forms of solar radiance. Waves of this radiance speed to the earth at the rate of more than five hundred trillions to the second; and impart their energy so that we

[1] "Recent Advances in Physical Science," p. 335: Prof. P. G. Tait.

have growth of grass. Cattle browse on this, and hold in another form of equilibrium, by integration of tissues, these metamorphosed sunbeams. Man, assimilating the nitrogenous tissues of the cow, builds up that wonderful white and grey nerve-tissue by which is obtained the astonishing and completed transformation of solar radiance into human consciousness. We know of nothing more wonderful than this continual miracle: a miracle of progress by daily infinitesimal steps and transformations, and without our being able to say —"there is the place of birth." It is certain that a series of actions, displayed by the various tribes of the animal kingdom, may be so placed that they form one whole; of which it is impossible for the human intellect to resolve the complex into the more simple. That is not all: mental life comes out of physiological life, but how mental activity was originated in organisms by the simple elementary modifications of external to internal relations, and passed from the automatism of lowest creatures to the highest act of consciousness in man, is a mystery; nor can we say where intelligence begins, nor when

"turned the dense black element
Into a crystal pathway for the sun."

We can think of a world, all dark, beginning to vibrate differently and in various rapidities until all gorgeous colours shine in light and beauty; or we may conceive, as to the low rumblings of many motions requiring tone until every musical note vibrates in world-wide oratorio; so miraculous and varied is that operation by which, from things dark and silent, God brings the light of human intellect, and the many prayers and praises which make the earth a vast cathedral.

Of the innumerable combinations of matter and incarnations of energy which are going on all around us, we only know a few of the simplest; what then

"In yonder hundred million spheres?"

Turn to the exactest of all sciences, Astronomy.

What is revealed? The diamond dust in the sky becomes suns and stars. Little cloudlets expand and reveal worlds of majesty. There are variable suns, binary and multiple systems, stars suddenly blazing forth in splendour, and mys-

terious dark orbs rolling in night. Great is the variety of the stellar system; yet not a tithe of the various orders of bodies are known; we have only a faint conception of the wonderfully varied forms of creation within the stellar spaces. Not long ago, astronomers could scarcely allow that the vast depths, wherein the planets pursue their career, are the home of countless smaller bodies rushing in wide orbits round the solar mass. Few or none believed that those faintly gleaming lights, passing with silent swoop across a star group, leaving no trace of their existence and seeming of as little importance in the universe as a rain-drop or snow-flake, indicated the close of a career which had often, by uncounted millions of miles, surpassed the utmost limits of the known planetary system. These crowds of independent orbs, rushing disorderly round the sun, in no sort an obedient family, would, it was considered, make the sweet bells of the planetary system to jangle, be out of time, and harsh: nevertheless, the earth, sweeping on in her path, is exposed to cannonade from more than a hundred meteor systems; and at critical periods is assaulted with heavier metal than that encountered in the second week of November: not only balls weighing many pounds, but of several tons, have been shot against her.

How wonderful are the coloured suns! The brilliant Vega, a splendid steel-blue star, in the constellation Lyra, at midnight in winter, and earlier with the approach of spring, as it skirts the southern horizon, scintillates with red, blue, and emerald light. Arcturus, low down in the east and north-east, in spring evenings twinkles yet more beautifully. Capella, towards the north, in summer nights, notably sparkles. Sirius, noblest of all—

> "The fiery Sirius alters hue,
> And bickers into red and emerald."

These various colours are caused in part by our own atmosphere; but the stars are not wanting in real colours of their own. Sirius, Regulus, and Spica are white stars; Betelgeux, Aldebaran, Arcturus, and Antares are red; Procyon, Capella, and the Pole-star are yellow; Castor is of slightly green tint; Vega and Altair are bluish: Castor has a green companion, Antares also, and there is the well-known "garnet-star."

In the double, triple, and multiple stars are many of the tints of the rainbow. "Here we have a green star with a deep blood-red companion, there an orange primary accompanied by a purple or indigo-blue satellite. White is found mixed with light or dark red, purple, ruby, or vermilion." One of the most startling facts is—their colour is not unchangeable. Of old, Sirius was red, now it is white. A double star in Hercules changed in twelve years "from yellow, through grey, cherry-red, and egregious red, to yellow again." These show that the stars are formed of different elements, and that their vapours burn with variable brilliancy. There is Mira, the marvellous, shining brightly for two days, thirteen hours and a half, as a star of the second magnitude; then, *suddenly* losing her light, in three hours and a half falls to the fourth magnitude; then, the brilliancy growing, in another three hours and a half she reattains her former lustre. The times of at least twenty-four variable stars have been calculated. Sometimes, as in the case of temporary stars, a spectrum of the fourth class is suddenly crossed by the bright lines of hydrogen, showing either a last discharge of red flames, or a flicker due to some last chance impact of meteoric matter.

Suns far off in space, and, for aught we know, important as our own, quickly blaze with wonderful brightness, and afterwards lose their splendour. A beautiful star appeared in Cassiopeia, A.D. 1572. It surpassed all other stars, was as Venus at her brightest, became of the first magnitude, exhibited various hues, and disappeared in March 1574. In May 1866, a star which had long shown feebly in the constellation of the Northern Crown, suddenly burst into flames, and attained the glory of a second magnitude star. Scientific men thought that the hydrogen encircling it passed from a relatively cool state, like that surrounding our sun and Capella, and Aldebaran, into intense heat, which made it glow with a hundredfold brightness. It is now, again, a star of the tenth magnitude. "For the years A.D. 807, 840, 1096, and 1607, and several others . . . a great deficiency of the sun's light has been recorded. Thus in the annals of the year A.D. 536, the sun is said to have suffered a great diminution of light which continued fourteen months. From October, A.D. 626, to the

following June, a defalcation of light to the extent of one-half is recorded; and in A.D. 1547, during three days, the sun is said to have been so darkened that the stars were seen in the day-time."[1]

We can study, not only changes in splendour, and fatal catastrophes, and the succession of phases of life in one particular star, but different simultaneous phases in many: some stars starting into life, others becoming older, others older and older, sometimes a dead star—a star scarcely noticeable by the astronomer; and the dead sometimes lives again. One, lately examined by Dr. Huggins, was a star which had cooled down to its lowest stages; but it became bright by an outburst of hydrogen. Does all this, like the rolling of the ocean, rhythmically repeated yet ever varying, while it rivets our attention and hurries us along, leave a final impression of solitude on the mind? No: the motions of the stars, orderly and stately in gorgeous hue, bear down into the beholder's soul conceptions of hitherto unimagined glory and beauty.

Take our own system: the rule of law within may itself be regarded as a miracle, if wrought by chance. The chances against the uniformity being by chance are, Laplace states, four millions of millions to one. The movement of the sun on its axis, of the planets round the sun, of the satellites round their primaries (those of Uranus, possibly Neptune, excepted), and the motion of all on their axis, is from west to east. There is nearly a regular gradation in their density, and the distances are curiously relative, weaving them into one web of mutual arrangement and harmonious agreement. Nevertheless, the uniformity is not an invariability impressed and stamped by unintelligent force. Variety prevails everywhere. Take the rates of axial rotation. The sun revolves in about twenty-five days eight hours; the moon requires a month to turn in; the earth occupies one day; Mercury, twenty-four hours and five minutes; Venus about twenty-three hours and a half; Mars, somewhat more than twenty-four hours and a half; Jupiter, less than ten hours; and Saturn, say, ten and a half hours. We are sure that there is reason in all this: for

[1] "Outlines of Astronomy:" Sir John F. W. Herschel, Bart.

"if the universe be delivered over to the undisturbed action of its physical processes, all force will finally pass into the form of heat, and all heat come into a state of equilibrium. Then all possibility of a further change would be at an end, and the complete cessation of all natural processes must set in . . . the universe from that time forward would be condemned to a state of eternal rest."[1]

From such a state of eternal rest the world could not raise itself; and into such a state it would long ago have passed, were it not for Reason guiding and Energy sustaining. The leaps, surprises, reversals, and new beginnings, found within our system (for the births of planets occurred at widely remote periods, and the stages of their growth differ enormously in duration) are of a nature that requires not only might but wisdom for their maintenance. "We see our earth passing through a vast period from its first existence as a separate member of the solar system, to the time when life appeared upon its surface: then began a comparatively short period, now in progress, during which the earth has been and will be the abode of life; and after that must follow a period, infinite to our conceptions, when the cold and inert globe of the earth will circle as lifelessly round the sun as the moon now does."[2] We know that our earth may so change in the course of hundreds of thousands of years to come; that none of the forms of life now existing, could live in those changed conditions; nevertheless, we also know that descendants of the creatures now living may then be as well fitted to the existing circumstances as are the most favoured races of our time, so great and marvellous are the varieties of God's handywork. The whole leads to the belief, that wander whithersoever we may, far as we can and as long as we can, we shall yet find ourselves within the populous dominions of the Almighty.

This study of varieties may well end in leading heart and mind to some, though faint, conception of the great changes and catastrophes yet to come.

[1] "Interaction of Natural Forces:" Prof. Helmholtz.
[2] "Science Byways," pp. 15, 16: Richard A. Proctor.

At every transformation of heat-energy into work a large portion is degraded, and only a small portion is put into real work. It is easy to transform all mechanical or useful energy into heat, but only a small part of this heat-energy can be turned back into work. Every change degrades or dissipates the heat: it becomes less and less available for further transformation. Heat is really the communist of the universe, tending for ever and ever to equalization, and will, no doubt, bring our system to an end. The sun, supporting us with heat and energy, is becoming older and colder. By something analogous to ethereal friction, the earth and planets are spirally drawn nearer, and will at length be engulfed in his mass. By that collision, energy will be converted into heat, and the power of the sun have partial and temporary restoration to do more work; but this process also will come to an end. Then the fall together, say of some other sun, distant as Sirius, and our sun, would generate thirty or forty times as much energy for future radiation to other planets. Then, the fall together of other suns will convert more energy into heat and matter to be evaporated and transformed into gaseous or nebulous condition. Ages and ages pass away, but ultimately all masses share the same fate, give out their light and heat into space, become dark, and are no more seen.

Whether this process completes itself independently in different parts of the sidereal system by local integration and disintegration, or by aggregating the whole matter of the sidereal system, the diffusion will undo all previous concentration. Without entering any transcendental inquiry as to the existence or non-existence of infinite systems, but keeping to a practical and soluble question, there is reason to think that all existing solar systems will be reduced again to nebulous form. The universally co-existent forces of attraction and repulsion cause, when attraction prevails, creation to predominate; and when repulsion predominates, chaos to prevail. The actions of the past are repeated in the future, in form, in motion, in life; the same in principle, never the same in concrete result. Destruction follows destruction, through periods long delayed, until the things seen and temporal

pass away. Then, if He will who rules, other beginnings and creations arise to occupy an immeasurable future as preceding rhythms of Divine Power occupied an infinite past.

Our mind contemplates with awe the sublime spectacle of space and time, of creation and chaos, of life and death, shrined within the omniscience, omnipotence and omnipresence of God. The epochs of transformation may be separated by time intervals so enormous that the duration of life on our earth and the duration of our earth itself, may be but a second as compared with a thousand years.

Energies wholly unknown to us are at work, and at any moment may produce weal or woe. That which overtakes other worlds may happen to our own; for this, and, something yet nearer, our own dissolution, we have to prepare. Many considerations are involved in it. We will take one that fits our study—The life-sustaining orbs around us, are surpassed, probably, a thousand-fold by those yet lifeless, or those long since dead; and it is not unscientific to think that some of us may wander as spectres among inert lifeless masses of ruined worlds—where the dead bury their dead: while others, entering that which is now invisible, possess a world truly amazing. We are all passing away, and quickly, from the visible to the invisible.

The lower animals are a parable to us. At certain seasons they abandon their usual haunts, turn from wonted enjoyments, and seek some asylum, as if to prepare for new untried condition—they follow a sure guiding of nature: even the insect is not deluded in preparing for metamorphosis—no, not one; and awakes unto the gaiety of a new and higher life. Nor shall human dust be irrecoverably scattered by the winds: for good purpose our eyes traverse and oversee the immensity of space, and our minds form true notions of the universe. The sun, the stars, the planets, are "brilliants floating in an upper ether," to light us in that pathway of the just which shineth more and more unto perfect day. Beside all this, we have the loving influence of human soul on human soul. We are conscious of a baptism and consecration in which the true belief of holy men binds us over to purity and rectitude. Blessed influence, not calculable by algebra, not

deducible by logic; mysterious, effectual, mighty, as the hidden processes by which life is quickened. Words are but poor ghosts of the grand reality of the things that make themselves felt as if they were our flesh; they breathe upon us with warm breath, they touch us with responsive hands, and look at us with sincere glad eyes. The presence of soul to soul is a power filling with emotion, attractive as flame to flame, and drawing us with gentle compulsion to the sweet conviction that there is also union with the Lord.

STUDY XXI.

FOLLIES OF THE WISE.

"Not as yet
Are we in shelter or repose,
The Holy House is still beset
With leaguer of stern foes."

KEBLE.

"Conquer we shall, but we must first contend;
'Tis not the fight that crowns us, but the end."

ANON.

WE PROPOSE to investigate certain statements made by a few scientific men concerning Scripture. If the inquiry should confirm that remarkable fact — "the natural man receiveth not the things of the Spirit of God: for they are foolishness unto him: neither can he know them, because they are spiritually discerned" (1 Cor. ii. 14)—it may lead them and us to a more reverent heed of that which God has spoken by the prophets, and by His Son Jesus; that the world may be full of a revealed Deity, yet the outside manifestation shall exercise little or no influence for good; unless, by winning the conviction and the assent of the will, it awakens the conscience and regenerates the affections.

At the outset we encounter a puzzling truth: the Bible, neither teaching science, nor written scientifically, has well nigh for ever seemed against the secular science of the age, yet the Old Book and the Old Faith survive. Not only so, theologians have been among the first to point out astronomical and other difficulties in the Bible; while the greatest astronomers and most renowned physicists have alway asserted that Mind planned the world: its processes and laws having interpretation by intelligence, as they are the manifestation of Intelligence. To mention only two, who can doubt Newton's

piety, or distrust the simple child-like faith of Copernicus, concerning their Home with the Everlasting?

Moreover, the oppositions of Science in one age against Scripture have generally been removed in the next, and though the time for full mutual reconciliation and verifying has not arrived—the mechanism of the world not being wholly revealed, and the best of us "stretching but lame hands of faith,"—the ablest men have a growing and abiding conviction that intelligence and piety unite in the perfect man.

The objectors of old were acute as are objectors now. Ancient Heathens well handled, and then cast away as useless, the very weapons which men of our own day gather and refurbish. The Jews, long ago, by pseudo-criticism, did all well nigh that could be done against the Messianic Prophecies, but those Prophecies yet testify and truly.

The complaint that science was not Divinely taught is evidently unreasonable—"If the Jews had been told that water existed in the clouds in small drops, they would have marvelled that it did not constantly descend; and to have explained the wisdom of this would have been to teach Atmology in the Sacred Writings. If they had read in their Scripture that the earth was a sphere, when it appeared to be a plane, they would only have been disturbed in their thoughts, or driven to some wild and baseless imaginations, by a declaration to them so strange. If the Divine Speaker, instead of saying that He would set His bow in the clouds, had been made to declare that He gave to water the property of refracting different colours at different angles, how utterly unmeaning to the hearers would the words have been!"[1] It is not for the sake of physical science; but for the eternal problems which lie behind all natural phenomena, and are unaffected and unchanged despite all other changes, that the world reverently holds in her hand the ancient Book, and makes an effort to understand her childhood.

Some parts of the Bible have always seemed more adapted to particular periods; and, conversely, some more opposed.

[1] "Philosophy of the Inductive Sciences," vol. i. p. 686: Rev. W. Whewell, D.D.

In the Crusaders' times such words as—"Take up the Cross," "Glory in the Cross," filled every mouth. During Puritan days, the New Testament being greatly neglected, the Old was all in all. Now the Old is neglected, and some parts are furiously assailed under the mask of science. We have no Ulphilas to take away the σκανδάλά, or stones of stumbling,[1] even if we needed one: but as Abbot Joachim's prophetic book of the Everlasting Gospel is forgotten,[2] and the attacks of Voltaire and his literary progeny, wicked as witty, are disregarded; we, reviewing the past, are sure that speech of the following sort will soon be silenced—"Revealed Religion is on its trial before the world. The question is not so much whether we shall recite the damnatory clauses in our Athanasian Creed, as whether any creed whatever is worth reciting. Christianity is on its trial before the world, not for some trifling blemishes which a little mild correction may mend, but for its very life; and if the clergy, its natural defenders, can show no intelligible reason why it should stand, common sense, in this country at least, will very speedily decide upon its merits in a somewhat rough and ready fashion."[3] This writer mistakes the errors of believers for faults in the grand old Faith: Christianity is not on trial—men are on trial by Christianity, not Christianity by men. Our blessed Lord did not make everyone pleased with religion, or with Him; and as for those who expect Christianity to answer riddles before the riddles are made, they must themselves answer this riddle; that despite the opposition of secularists, "no amount of knowledge, of the kind which alone physical science can impart, can do more than widen the foundation of intelligent spiritual belief."[4]

We shall not take in hand those sensual and irreverent ones, who glory to find fault with whatever is pure and sacred; and would fain be witty, by making a jest of those things which wiser men worship. They, gloating over a good man's error, and glad to find any nakedness of Scripture,

[1] Dean Milman's "Gibbon," small edition, vol. iv. chap. xxxviii. p. 322.
[2] Dean Milman's "Latin Christianity," 8vo, vol. viii., book xii., chap. vi. p. 347.
[3] "Modern Christianity a Civilized Heathenism," Preface to second edition.
[4] "Reign of Law:" Duke of Argyle.

imitate an ancient odious sin (Gen. ix. 22, 23). It would be equally unwise to notice men who, if they chip a bit from a rock, contemptuously fling it at the Sacred Shrine. Those bone-finders in caves who threaten to break down all the houses of God in our land, must be left in their self-confident possession of Samson's weapon. Those, moreover, who count the result of galvanic experiments on a frog as proof that the phenomena of nature are wholly apart from the Almighty, believe certainly that the mist they live in is a mountain-height, and will affirm that "the whole complexion of religious and scientific thought must be changed." Such men recall to our memory the words of Thomas Fuller, whose humour was full of wisdom, and wisdom full of humour:—"To speak plainly, it is not the fierceness of the lion, nor the fraud of the fox, but the mimicalness of the ape, which in our age, hath discredited the undoubted truth: but what if the apes in India, finding a glow-worm, mistook it to be true fire, and heaping much combustible matter about it, hoped by their blowing of it thence to kindle a flame; I say, what if that laughter-causing animal, that mirth-making creature, deceived itself; doth it thence follow that there is no fire at all?" "What," we add, "If some did not believe? Shall their unbelief make the truth of God without effect? God forbid."

Our task is specially difficult and painful: for the follies of wise men are a personal disadvantage to everyone, and a public loss. To belittle great men is to dwarf ourselves; and when their folly concerns the best hopes of our race every good man must weep rather than exult.

It is asserted—"Genesis is a narrative based upon legends; Exodus is not historically true; the whole Pentateuch is unhistorical and non-Mosaic; it contains the most extraordinary contradictions and impossibilities, sufficient to involve the credibility of the whole—imperfections so many and so conspicuous that they would destroy the authenticity of any modern historical work." [1]

The writer taxes the pious and faithful, confessedly the most thoughtful men in the world, with grossest ignorance;

[1] "Conflict between Religion and Science:" Prof. Draper.

as capable of being deluded in the most extraordinary contradictory and impossible manner. He cites from an apocryphal book, Esdras ii. 14 as proof that Ezra, aided by five other persons, wrote the Pentateuch in the space of forty days. Against this, we use the testimony most likely to avail with men who make and credit gross denials of Scripture verity, that taken from their own school of thought—"Tradition has (without any variation, as I believe) ascribed the history of these transactions to Moses. . . . The language and the degree of minuteness of the Israelitish history, from the first energetic expostulations with the Egyptian king, to the entrance into Canaan, are, to my mind, evidently those of a contemporaneous account. The details of interviews with the king, on the one hand, and of transactions with the enslaved people, on the other hand, can only have been known to the leader of the nation. The history of the occurrence at the burning bush (whatever difficulties may accompany it), and of other events nearly at the same time, can scarcely have been invented by another person . . . The arguments, therefore, for the truth of the established tradition appear to me so strong, that nothing short of irrefragable reasoning seems sufficient to destroy it."[1] "I do not allude at any length to the recension in the time of Ezra, because no critic, as I believe, has suggested that any addition to or modification of the Hebrew Books, as they then existed, was made at that time."[2]

Another groundless charge: "Sacred cosmogony regards the formation and modelling of the earth as the direct act of God; it rejects the intervention of secondary causes in those events."[3]

This statement is wholly incorrect. With far more fairness and truth it might be said—Scripture gives the true theory and real facts of the scientific doctrine of Evolution; for water is said to produce the things of the deep; and from the earth, as mother, proceed every plant and living creature of the land. David, with true science and common-sense, used these

[1] "Notes on the Earlier Hebrew Scriptures:" Sir G. B. Airey, K.C.B., p. 23.
[2] "Notes on the Earlier Hebrew Scriptures:" Sir G. B. Airey, K.C.B., p. 7.
[3] "Conflict between Religion and Science:" Prof. Draper.

words as to God—"Who maketh His angels spirits; and His ministers a flaming fire" (Ps. civ. 4). The LXX Translation, and the Epistle to the Hebrews, i. 7, lead us to understand that God maketh His angels like winds (viz., incorporeal, swift, powerful), and His ministers (His heavenly servants) as a flame of fire. In Mendlessohn's "Beor" the verse is explained: "He maketh the winds His messengers, and lightnings His ministers." Kimchi, Yarchi, and others, take it much in the same way; in any case it is plain that God uses various secondary causes.

The Professor further states—"A Divine revelation of science admits of no improvement, no change, no advance. It discourages as needless, and indeed as presumptuous, all new discovery, considering it as an awful prying into things which it was the intention of God to conceal."[1]

Scripture, it seems we must state it again and again, is not a revelation of science, therefore, the charge is groundless. So-called scientific statements are, for the most part, popular illustrations for the use of unscientific people. David shall again admonish the professor, as to the studies of those who love Scripture—"The works of the Lord are great, sought out of all them that have pleasure therein" (Ps. cxi. 1, 2). Solomon, no mean man, gives a rebuke, for he greatly studied those works (1 Kings iv. 30-33). The founders of our universities, and the ancient endowers of our schools, rightly thought that the knowledge of God as Creator, leads to a more reverential and better understanding both of Creation and Revelation. These devout men, far from thinking that Scripture allowed no improvement, no change, no advance, encouraged as useful, and indeed as reverential, all search after truth: pious men have ever been the great promoters of learning. The best thinkers hold that the universe is not only the skilful work of a Creator, but of a Creator acting by means of those physical properties and chemical combinations of matter which He had Himself conferred.

Another able man, in his own line of things, praises and dispraises at the same time:—"Two great and fundamental

[1] "Conflict between Religion and Science:" Prof. Draper.

ideas, common also to the non-miraculous theory of development, meet us in this Mosaic hypothesis of Creation, with surprising clearness and simplicity—the idea of separation or *differentiation*, and the idea of progressive development or *perfecting*. Although Moses looks upon the result of the great laws of organic development (which we shall later point out as the necessary conclusions of the Doctrine of Descent) as the direct actions of a constructing Creator, yet in his theory there lies hidden the ruling idea of a progressive development and a differentiation of the originally simple matter. We can therefore bestow our just and sincere admiration on the Jewish lawgiver's grand insight into nature, and his discovering in it a so-called 'Divine revelation.' That it cannot be such is clear from the fact that two grand fundamental errors are asserted in it, namely, first the *geocentric* error that the earth is the fixed central point of the whole universe, round which the sun, moon, and stars move; and secondly, the *anthropocentric* error, that man is the premeditated aim of the creation of the earth, for whose service alone all the rest of nature is said to have been created."[1]

The learned professor ought to know that Moses says nothing about man being "the premeditated aim of the creation;" but that man, being the highest work of God done on earth, was made lord of earthly creatures; and this cannot be denied. Further, it is somewhat inconsistent to credit Moses for far-reaching wisdom; and yet, to tax him with rudest ignorance in that very thing concerning which he was wise. As to the Geocentric Error, there is no error; the earth is popularly, figuratively, poetically, and, as our own stand-point, the centre. The Anthropocentric Error may, likewise, be explained as a popular mode of speech; but, in reality, all true spiritual presentation passes into the infinite—suggests rather than expresses. Scripture must be judged in accordance with all the facts: the earth is great, the sun is greater; and as to far-off worlds, science ends; and assertion becomes unscientific; yet to those worlds and beyond them travels the human spirit seeking brighter light

[1] "The History of Creation."

and higher life. Are we to wonder that men, the central point of circling mysteries, are a spectacle unto angels? that the creation of the earth, and the state of the earth, are connected with a mysterious past and a wonderful future—the existence of evil and rescue from evil? In Creation, the Invisible God is manifested or clearly seen (Rom. i. 20); and, in Redemption, the holiness and goodness of God are made plain (Eph. i. 10; iii. 9, 10). Creation and Redemption, however separate in some respects, concern many worlds; and man is not only the spiritual centre of the earth, but constituted the centre of transactions concerning many other operations and dwellings of God. Our eloquent preachers, pious statesmen, philosophers, architects, and engineers, will possibly set hearts a glow in other worlds, develop thought, oversee work, contemplate arrangements, and possess powers of rule on grandest scale.

The expressions—rising, setting, and travelling of the sun, the fixity and foundations of the earth, though the only intelligible language, have been found fault with. We are told "Scripture really speaks of a flat earth; and of the sky as a watery vault in which the sun, moon, and stars set; of the firmament as a solid arch, literally something beaten or hammered out; and of the Almighty as a gigantic man."

Really, such fault-making displays neither intelligence nor candour; if opponents would remember that no science is involved here, that these are the every-day statements of all ages; and if they discriminate as to what is fact, and what figure, where literal accuracy is to be looked for, and where a poetic thought, they will be preserved from an infinity of folly. The firmament is that in which, to our eyes, sun and stars do set; and is, indeed, a space for waters. The earth, in common consideration, is ever spoken of as a plane. In a higher sense even than is stated, the sun does go forth as a giant to run a race.

The stability of the earth is counted an error:—

"The earth also shall be stable, that it be not moved."
1 Chr. xvi. 30.

"The world also is established that it cannot be moved."
Ps. xciii. 1; xcvi. 10; cxix. 90; Eccl. i. 4.

The real meaning is—God, who made the earth, will support it; the excellent order which He established shall be maintained; neither storms upon it from without, nor any commotion from within, shall unsettle its abiding.

The principal texts mentioning the movement of sun and stars are:

> "The sun was risen upon the earth." Gen. xix. 23.
>
> "The sun went down." Gen. xv. 7.
>
> "The sun . . is as a bridegroom coming out of his chamber, and rejoiceth as a strong man to run a race. His going forth is from the end of heaven, and his circuit unto the ends of it." Ps. xix. 5, 6.
>
> "The sun also ariseth and the sun goeth down, and hasteneth to his place where he arose." Eccl. i. 5.

Science uses the same language now, and it is the best language. He who finds fault with Scripture for poetically and popularly speaking of the sun, must deal with other books in the same manner. If, however, scientific accuracy is unreasonably demanded; we answer that even here, "deep answers to deep within the sacred oracles"—the sun revolving on his axis, as actually viewed from the earth by scientific men, and as revolving around his own great centre, does rise, set, go forth and return, in a manner truly wonderful, and surpassing all expectation.

Two other passages are asserted to be incorrect:—

> "Sun, stand thou still upon Gibeon; and thou moon in the valley of Ajalon." Josh. x. 12.
>
> The sun and his shadow are stated to have returned ten degrees. 2 Kgs. xx. 10. Is. xxxviii. 8.

The words translated "sun" and "moon," rather refer to the light than to the substance of those bodies. In what way God continued the sun-light, or a light resembling it, so that Israel fought as in the day, we know not, nor does it seem in the power of man to explain the wonder which confirmed Hezekiah's faith; but a scientific eye-witness might possibly have discerned some of the means by which the different marvels were wrought, though the stopping of the earth in its axial rotation, or the return of degrees, may be inexplicable as a change in natural order naturally effected. No human effort

can bring Scripture miracles within the understood range of natural order; indeed, their evidential value may depend upon deviation from that order. Both of those in question may have been special providences—coincidence of the physical event with the moral lesson in illustration of Divine rule.

Providential and miraculous arrangements are probably similar to those operations which we see day by day in the course of nature; for all things, ordinary and extraordinary, are wrought by the eternal omnipresent Power. As nature, ever flowing onward in the uninterrupted rhythm of cause and effect, is mediately used and subordinated by the human will acting as a trigger to liberate controlling power; so Divine Will acts mediately by Nature and directly upon Nature, with infinite wisdom and power.

With somewhat of scientific affectation calculations have been made to show that the miracle wrought on behalf of Israel, in the days of Joshua, required the energy of six trillions of horses, was a wasteful expenditure, in a few hours, of that which would have provided fighting power for all the armies of the world during millions of years.[1] Such trifling needs no grave reply. Match it with another calculation: the wisdom and power requisite to form and give life, by human means, to a cheese mite, would require more than all the millions of men from the beginning of creation till now have possessed; what a waste of power for God to have been at such expenditure for a cheese mite! Moreover, of 2,300 million parts of light and heat emitted by the sun, our earth only receives one part. Surely those who blame us for likening God to man—when we exhort men to be God-like, are more blameable for making God man-like, by accounting that anything is either little or much to Him. Greatness and smallness are relative—nothing more: "*there is absolutely nothing* to show that even a portion of matter which in our most powerful microscope appears as hopelessly minute as the most distant star appears in our telescopes, may not be as astoundingly complex in its structure as is that star itself, even if it far exceed our own sun in magnitude.[2]

[1] "Miracles and Special Providences:" Prof. Tyndall.

[2] "Recent Advances in Physical Science," p. 284, Prof. P. G. Tait.

If miracles were bound up with credulous prattle, and stood alone, doubtless, faith in miracles would pass away with our childhood; but, being associated with words and deeds of imperishable wisdom and sublime purity, they are regarded as sparks from the great wheel of Divine operation. They are in connection with examples of moral grandeur, nowhere matched in the history of mankind, proving that they are not inventions of the crafty and deceitful. If opponents answer—"we do not deny the moral grandeur of those who asserted the miracles, but we maintain that in an unscientific age moral grandeur is compatible with an uncritical belief in the marvellous;" then we reply—The men used as agents to work them, and many of the eye-witnesses, were the most thoughtful and experienced of our race: not likely to be, and, in many cases, could not be deceived: and the Power displaying the marvels is that very Power which Science acknowledges to exist behind all phenomena. Nor is that all: those physical marvels are given in attestation of, and lie at the foundation of, whatever knowledge is possessed concerning Forgiveness of sin, Redemption from evil, and Immortality of life.

We are gravely told—"The universe of the Bible is limited to a few thousand years in time, and to a narrowly bounded area in space."

Where is it so limited? Certainly not in the Bible, where are glowing descriptions of the grandeur and ancientness of the universe. Limitations, that do exist, must be interpreted by the larger accounts; or explained by the purpose for which the limitation is made. The Inspiration of a Prophet was not universal as to knowledge; but confined to that which he had to perform. As to the Earth's antiquity, the Rev. R. Greswell, in "The Threefold Cord," says—"In the very year, which, it has often been shown, is assigned by the chronology of the Hebrew Bible as the year of the Mosaic Creation itself, B.C. 4000, we find all the measures of time, both the natural and the civil, which have entered this system from the first and are still making part of it, meeting together." We cannot agree with the above statement. It is not in man to know, with any accuracy, when time began to be measured by day and night. Job was admonished of this—"Where wast thou when I laid

the foundations of the earth?" (Job xxxviii. 4). Moses, so far from counting the world new, spoke of the mountains as very old (Ps. xc. 2). Other passages (Gen. xlix. 26, Deut. xxxviii. 15, Job xv. 7, Prov. viii. 22-31) plainly declare the ancientness, even as "The laying of foundations," "The laying of the corner stone," "The stretching out of the line upon it," mark a slow and progressive operation.

The time occupied by the Mosaic Days has been a subject of controversy from the earliest times. Some great men, considering the eternity of God and the infinitude of His works, maintained that everything done in connection with the earth occupied only a moment of time; but that this moment is impossible to imagine and much more so to explain. Biblical archæologists, of modern times, agree that the common chronology is too narrow. Ancient records, the development of commerce, and government, the time required for the production of a thousand languages from the confusion of early speech at Babel, and the separation of so many human families from the early race, "require a cradle of larger dimensions than Archbishop Usher's Chronology." The early Church at Antioch counted six thousand years from the creation till the birth of Christ; the Greeks took five hundred from that number; Eusebius, taking five hundred more, was content with an antiquity of five thousand two hundred years. The Samaritans counted thirteen hundred and seven years from the Creation to the Deluge. The Hebrews, sixteen hundred and fifty-six. The Septuagint, two thousand two hundred and sixty-three. The sum of all is—God has not given any revelation as to the time which has elapsed since He made the world. We agree, so far, with Sir G. B. Airy, concerning the tenth chapter of Genesis, as to interpret without scruple "the filial relation of persons as meaning the colonial relation of tribes."[1]

We agree with Aristotle — Nature is not full of incoherent episodes, like a bad tragedy; yet we supplement the dictum of Leibnitz—"La nature n'agit jamais par saut," by wider experience—"Nature sometimes does make a leap."

[1] "Notes on the Earlier Hebrew Scriptures," p. 45.

While allowing the Pythagorean doctrine of pervading order in the universal κοσμός; or, as the Bechuana chief said—"One event is always the son of another and we must not forget the parentage;" we do not reduce history to nothing better than an almanac, nor allow that morals can be explained by mechanics. It is somewhat premature for a few physicists to account orthodox theology a grave-yard, the Bible a coffin, and our Lord that dead one whom they will bury out of sight. Those who will not believe, who arrogantly refuse Scripture, and choose to be guiltily ignorant of its marvellous evidence and proof of Divinity; who want the Lord to be always walking on the sea; but, even if He did, would have less than the little faith of Peter; who profess to educe the world from something that was ever less and less, so that nature began from no nature, and life from no life; surrender their position and accept the miracle of miracles—"Can there be anything more miraculous than the existence of man and the world? anything more literally supernatural than the origin of things?"[1]

From many painful examples of the unbelief that clings as a parasite to certain physicists, take a work from the pen of a leader.

He says concerning the observance of the Sabbath Rest —"To give sanction to this precept, the authority of at least a myth was requisite. I believe it was simply for this reason that the myth of the six days of creation was preserved."[2] The second narrative in Genesis ii., was "to confirm the solemnity of marriage; and that for this purpose only, or chiefly, the second history of creation was preserved."[3]

We are to believe that Moses, who has produced a greater effect on the history of the civilized world than any other man, one only excepted; Moses, of whom it is stated, "that the mighty inspiration came upon him which convinced him that, great as were the difficulties, he could lead his people to independence and to territorial possessions; but that it must be done by the establishment among them of a new and pure religion;"[4] became, in order to establish "a new and pure

[1] "Lothair."

[2] "Notes on the Earlier Hebrew Scriptures," p. 17: Sir G. B. Airy, K.C.B.

[3] *Ibid.* p. 18.

[4] *Ibid.* p. 54.

religion," one of the greatest deceivers in the world. We are to believe this in order to disbelieve miracles!

The death of Abel is stated to be "simply a myth, explaining the hostility between the feeders of sheep and the tillers of the ground."[1] The punishment of Cain is a myth—"a holy myth would be required . . . to restrain a half savage people."[2] Concerning Lamech—"It appears that the history of Lamech is a mere myth, floating down from some distant age, and preserved by Moses as a sanction for the beneficent measures which he was anxious to enforce."[3] The terrors of the Lord on Mount Sinai, are attributed to a volcanic eruption;[4] and the glory seen in the cloud was "either the smoke of Sinai, or the reflection of its fire as seen in the clouds."[5] The water obtained at Rephidim (Ex. xvii. 1), by smiting the rock receives this explanation—"I think it will appear that this was some artificial, or (in modern terms), engineering process by which water was procured."[6] A larger explanation of verses 5 and 6 is given—"The meaning seems to be that, instead of patiently relying on the goodness of God, under circumstances which would have justified waiting, he undertook some mechanical work for obtaining water. Or, possibly, he may have used some forced labour, carried out with cruelty, in the engineering."[7] How the people were persuaded that God helped them, though all was done by engineering, is not explained. The punishment of Nadab and Abihu by fire from God (Lev. x. 1, 2), is thus misrepresented—"I suppose Moses put them to death immediately."[8] The destruction of the two hundred princely rebels (Ex. xvi. 35), was not by fire from God, but "by the act of Moses. What kind of pitfall had been prepared for the few, and what form of death for the many, we cannot precisely say."[9] No character seems sacred; as for Elijah and Elisha, we are told—"Of those who, with great ability, displayed unlimited ferocity are Elijah, who slaughtered without mercy the party opposed to him; Elisha, who instigated Hazael (vizier) to murder Benhadad (king) of Syria, and who set up Jehu

[1] "Notes on the Earlier Hebrew Scriptures," p. 26: Sir G. B. Airy, K.C.B.
[2] *Ibid.* p. 30. [3] *Ibid.* p. 33. [4] *Ibid.* p. 81. [5] *Ibid.* p. 80.
[6] *Ibid.* p. 91. [7] *Ibid.* p. 96. [8] *Ibid.* p. 92. [9] *Ibid.* p. 95.

apparently for the express purpose of committing wholesale slaughters, in which he was aided by the savage Jehonadab. The legendary history of Elijah and Elisha may be compared with that of Dunstan."[1]

The irreverence exhibited in these unwarrantable interpolations and misinterpretations, the rash charges made against holy men, the believing anything rather than that which is in Scripture, are astounding—as coming from one whose reasoning faculties have been highly cultivated. To get rid of miracles, to tie down God to modern notions, it is thought worth while to charge holy men, the best and greatest of our race, with cruelty, lying, and grossest deception. In order to be able to credit that the scheme of Redemption is without Divine authority, all recorded marvellous acts of God must be accounted unsubstantial figments, Prophets and Apostles must be denounced as the greatest deceivers in the world. Moses, who describes God as "The Lord, the Lord God, merciful and gracious, long suffering and abundant in goodness and truth . . . that will by no means clear the guilty" (Ex. xxxiv. 6, 7), is charged with the guilt of lying and murder; and yet, from this man we have "a code of social laws to which nothing then existing was comparable for purity and for clear definition of justice in the infinity of social relations. I imagine that everything good, in the legislation of modern times, has had its origin in the Sinaitic laws of Moses."[2]

We will endeavour to find a cause for the weakness, irreverence, want of sanctity, and assumption of authority, painfully marking such perversions of Holy Scripture.

A high degree of complexity wearies and confuses any ordinary intellect. Few minds either will or can apply the needful power of attention, and mental energy of several faculties, continuously in an involved process. The most vigorous experience a sense of fatigue, followed by lassitude, if they transgress either time or season in arduous manifold work; and the penalty has to be paid in confusion of ideas, and by

[1] "Notes on the Earlier Hebrew Scriptures," p. 102 : Sir G. B. Airy, K.C.B.
[2] "Notes on the Earlier Hebrew Scriptures," p. 93 : Sir G. B. Airy, K.C.B.

collapse of mental energy. On this account it has been thought necessary for intellectual action to be defined, so that men become Divines, Mathematicians, Logicians, Artists, in a technical manner. The result, to the individual, is a weak and partial apprehension of theology, and a narrowing of general knowledge. The advance of every mind along such narrow track has, it is true, the advantage of penetrating further into that which is unknown; for example, it is said—"it takes a man fourteen years to make himself acquainted with what has been done, and can now be known in regard to chymistry alone; nevertheless, this narrowing tends, when men are not profound and circumspect, to sectarianism in religion, and to a hard narrow mechanical spirit in science. The division of labour certainly enables adventurers and explorers to push further in particular directions; but unless the greater men attend to philosophy in its wider range, and to those elevated themes of theology which stand related to all sciences, physicists will be liable to that unnatural indifference and unbecoming ignorance, as to letters and learning, as to the spiritual and eternal, now so painfully and irrationally exhibited by a few who are otherwise scientific and amiable.

Theology suffers greatly from this narrowness. Its universal themes cannot be apprehended by any simple faculty; nor can the mere theologian, nor the simple physicist, co-ordinate the natural and the spiritual; which require the whole moral and intellectual nature, the old learning and the new science. At present there is no pre-eminently great one with synthesis of human powers. Individuality and technicality sound their own notes in utter neglect of harmonious and simultaneous movement, and the result is humiliating in the melancholy spectacle of men, capable of better things, grudging and tardy in acknowledging the merit of Divines, adopting the wildest theories as to theology, and converting the firm land of physics into a materialistic slough.

A few examples will serve to explain what we mean by narrowness.

St Paul is charged with maintaining the error that a seed dies before the young plant springs from it—"Thou fool,

that which thou sowest is not quickened except it die" (1 Cor. xv. 36). Whereas if the seed did die there could be no young plant.[1] The contention is, that a writer claiming to be inspired by Divine Wisdom illustrates his botany by stating as a fact what is not a fact. The reply is—the seed dies in giving life; the germ initiates the new plant, but the seed perishes. Jeremy Taylor says—"Every meal is a rescue from one death and lays up another; and while we think a thought we die." The law of all nature is that it lives by dying; in, by, and out of this death we are born again, atom by atom, every moment of our life. No one thinks that St Paul was a scientific botanist, or used the illustration in any other than a popular sense, and the accuser himself unconsciously vindicates the accused. "Physiology writes over the portals of life—

'Debemur morti nos nostraque,'

with a profounder meaning than the Roman poet attached to that melancholy line. Under whatsoever disguise it takes refuge, whether fungus or oak, worm or man, the living protoplasm ultimately dies and is resolved into its mineral and lifeless constituents—is always dying, and strange as the paradox may sound, could not live unless it died."[2] In like manner, Dr Beale constantly uses the graphic expression that the protoplasm of this or that kind dies into this or that tissue or secretion. "Every form in nature—leaves, flowers, trees, shells; every tissue—hair, skin, bone, muscle, results from the death of bioplasm" (Biop. p. 10).[3]

Professor Helmholtz, pointing out some defects in the eye, states—"It is not too much to say that if an optician wanted to sell me an instrument which had all these defects, I should think myself justified in blaming his carelessness in the strongest terms and giving him back his instrument. Of course, I shall not do this with my eyes, and shall only be too glad to keep them as long as I can—defects and all."[4]

We do not think that the learned professor meant to charge

[1] "Biogenisis and Abiogenisis:" Prof. Huxley.
[2] "Physical Basis of Life."
[3] "Protoplasmic Theory of Life:" T. Drysdale, M.D.
[4] "The Recent Progress of the Theory of Vision."

God with "carelessness," but a critic, even on purely optical grounds, should not speak of "defects" as if God had been remiss.

What are these defects? They shall be stated fully, but briefly. The cornea is that transparent window in front of the eye, like a watch-glass in front of the metal case. A short distance behind this is a crystalline lens, covered by the iris, a curtain of varying colour, perforated in the centre by the pupil—a round hole, the edges of which are in contact with the front of the lens. The lens is circular, biconvex, and elastic. It is attached at the edge by a circular band, the ciliary body, to the inside of the eye. The tension of this ring and of the lens itself, is regulated by muscular fibres, called the ciliary muscle. The contraction of this muscle diminishes the tension of the lens, and its surfaces, chiefly the front one, become more convex. The healthy eye, when at rest, sees distant objects distinctly: by contraction of the ciliary muscle it is accommodated to discern those which are near: thus the images of objects, whether near or far-off, are brought to a focus on the back of the dark chamber of the eye. This mechanism is sometimes disarranged, defects and different conditions of accommodation produce squinting, short-sight, long-sight, and no man can be said to have perfect sight. These failures are partly the result of our artificial way of life, partly of changes wrought by old age.

The chromatic aberration of the eye is that defect by which, all the colours not being brought to a focus, a dispersive image is formed. In common use this is of little or no ill effect; and, in scientific use, the fact of the eye not being achromatic is guarded against. Another defect is known as spherical aberration: the cornea of most human eyes is not a perfectly symmetrical curve, but is variously bent in different directions. Owing to these two defects, chromatic and spherical aberration, we cannot see vertical and horizontal lines at the same distance perfectly clearly at once: in all eyes, it may be said, there are distinct though often slight deviations from accurate centreing. In consequence of this ill-centreing, the image, say of a star, is not a single illuminated point; but the focus is irregularly radiated, and the rays

which we see around stars and other distant lights are images of the radiated structure of our lens.

Another defect: the crystalline lens, though it looks so beautifully clear, is not optically uniform in structure. There are shadows and dark spots, chiefly due to the fibres and spots in the lens; corpuscles also, and folds of membranes float in the vitreous humour, causing *muscæ volitantes* in our vision; so called, because they move with the movement of our eye. Lastly, there is that blind spot, the break or gap in the retina, where the optic nerve enters; and there are those smaller gaps of vision, caused by the minute shadows of the blood-vessels of the retina being cast on the field of vision.

These defects no more prove that the eye is not good, than moral evil is a demonstration that no Divine Government exists. Our contention is not simply that the eye is good enough—it might be contended that the world is good enough; but we contend that while nature testifies of eternal power and Godhead (Rom. i. 20), it attests the mysterious fact that nature partakes of vanity and trouble (Rom. viii. 20-23). Science, therefore, actually confirms Scripture as to the imperfection of all things: nevertheless, the defects described, which would be very troublesome in an artificial camera obscura, are not any real trouble or hindrance in the eye; in fact, it is very difficult to find some of them. We not only have two eyes, so one makes up for the defects of the other; but, as we are continually moving them, the field of vision is freed from those defects which irregularity and imperfection might occasion. Our eye has not only a very large field of vision, and all other optical instruments a small field which becomes smaller with the increased size of the image; but it is necessary for the image on the retina to be exact over a very small surface merely, namely, that of the yellow spot. In this small part of the field our power of vision is so accurate that it can distinguish the distance between two points, of only one minute angular magnitude, a distance equal to the sixtieth part diameter of the thickness of the finger-nail. Hence, the image which we receive by the eye, is a picture minutely and perfectly elaborated in the centre, with a rough sketching in all around.

Every instant, with rapidity, we turn the eye from one point to another in the field of vision; and this rapidity, with perfection of the smaller field, and the rough sketching in of the larger, make the eye far superior to every other optical instrument. We turn our eye to one thing at a time: so soon as this has been taken in, we hasten to another, and the sense of vision accomplishes all that is necessary. Whatever we want to look at we see accurately, and so quick is the transition from one object to another, that practically we possess the same advantages as if we viewed the whole field of vision at once. Just as quickly as the eye turns up or down, and from side to side, the accommodation changes to bring the object looked at into focus; and thus both near and distant objects pass with rapid succession into accurate view. The eye shows them so rapidly that most people, who have not thought how they see, are not aware of any change at all. By the eye alone we discern the wealth of form and colour among flowers, the distant landscapes of our earth, all the varieties of sunlight that reveal them, and know the countless shining worlds that fill unmeasurable space. It is the unsurpassed model of opticians, philosophers extol it as an organism full of wonders, poets and orators justly celebrate its praise.

The following words are printed in an address on scientific education—"Some time ago I attended a large meeting of the clergy, for the purpose of delivering an address which I had been invited to give. I spoke of some of the most elementary facts in physical science, and of the manner in which they directly contradict certain of the ordinary teachings of the clergy. The result was, that, after I had finished, one section of the assembled ecclesiastics attacked me with all the intemperance of pious zeal, for stating facts and conclusions which no competent judge doubts: while, after the first speakers had subsided, amidst the cheers of the great majority of their colleagues, the more rational minority rose to tell me that I had been taking wholly superfluous pains, that they already knew all about what I had told them, and perfectly agreed with me. A hard-headed friend of mine, who was present, put the not unnatural question, 'Then why don't you say so in your pulpits,' to which inquiry I heard no reply. In

fact the clergy are at present divisible into three sections: an immense body who are ignorant and speak out; a small proportion who know and are silent; and a minute minority who know and speak according to their knowledge."

It is not a matter of wonderment, when a learned professor insults the common sense and attainments of educated men —men in the habit of encountering unbelief and misbelief— that they regard him as trifling with them; and say, with some little warmth, "no one doubts the elementary facts in physical science:" no wonder that the more courteous minority think and say, "we know all about what you have told us."

The same professor attacks theology, in his Paper on The Origin of Species, *Westminster Review*, April 1860—"In this nineteenth century, as at the dawn of modern physical science, the cosmogony of the semi-barbarous Hebrew is the incubus of the philosopher and the opprobrium of the orthodox. . . Extinguished theologians lie about the cradle of every science as the strangled snakes beside that of Hercules; and history records that whenever science and orthodoxy have been fairly opposed, the latter has been forced to retire from the lists, bleeding and crushed, if not annihilated; scotched if not slain. But orthodoxy is the Bourbon of the world of thought. It learns not, neither can it forget; and though, at present, bewildered and afraid to move it is as willing as ever to insist that the first chapter of Genesis contains the beginning and the end of sound science; and to visit with such petty thunderbolts as its half-paralysed hands can hurl, those who refuse to degrade nature to the base of primitive Judaism."

The Professor reminds us—

> "Intelligence and courtesy not always are combined,
> Often in a golden house a wooden room you find."
>
> . . . . . .
>
> "The fire of rage was in him, and 'twere good
> You leaned unto his sentence with what patience
> Your patience may inform you."

Every one, even but a little acquainted with history, is well aware that science and true doctrine are never opposed. Religious intellectual and industrial progress culminates in the most splendid series of researches when God's glory and

man's welfare are the motives which unitedly urge devout and thoughtful men to fearless investigation of truth. The fanatical and ignorant, in all ages, are afraid to unveil her statue; they say—"we will none of this dogma, none of that science;" but the great and good have no fears that, perchance, they may encounter a ghastly death's head: they know that the beaming countenance of the image of Truth, raised by God Almighty, is the face of Jesus Christ, where Divine glory and human purity meet in rarest beauty. Feeling their way, as best they can, into that limited portion of facts lying within their reach, they interpret the Two Books of Revelation, the Works of God and the Word of God, as they are—not as men might like them to be. The mediæval conception of the material and spirit world, as presented by Dante, was in harmony with the best science and the urgent wants of the time; but the Copernican revolution displaced all that, and scientific light thrown on the Bible enables us more largely to understand Providence, and to see that God's plan for every man is written in the physical laws of the universe and in the pure morality of Holy Scripture.

It is time that all good and true men, whether professed students of Science or professors of Religion, put down every feeling of antagonism. The roll of names, illustrating the annals of science, does of itself ennoble that pursuit; the Newtons, the Wallises, the Wollastons, the Davys, the Rumfords, the Faradays, confer imperishable renown; will not praise be added to their successors if, enfranchised from narrowness, they recognize those other lights which shine here and there in the path of human life, that wayfarers may walk cheerily onward to their future home?

For those who would falsify our high lineage, and require that we discard, as a romantic delusion, the ennobling conviction that we are little lower than the angels; we have an answer in the words of Goethe—"No strong-minded man suffers his belief in immortality to be torn from his breast." Indeed, we can show that their science is neither far-searching nor deep-piercing, and show it in their own way. Acting on their words—"take nothing on trust, ... learn of nature, ... listen to the voice of truth"—we try their knowledge;

we empty a lark's egg into a little vessel, a thrush's egg into another little vessel, a starling's egg into a third little vessel, and a blackbird's egg into a fourth little vessel, and, having destroyed the shells, ask these men to justify our confidence in their skill by severally naming the birds: they cannot; no, not even by aid of a microscope.

These are a small matter, try something great. Take a Camel, show the skeleton, and inquire—our teachers never having seen a Camel before—"Is it possible that skeleton can represent an animal with a huge hump on his back?" They will either say—"We know not"; or prove from the bony structure that the hump is an absurdity almost approaching the impossible.

Try a Lion, a Tiger, request an explanation of the osteological differences which constitute the one a Lion-frame, the other a Tiger-frame. They have no explanation.

Respectfully ask why, during the whole controversy about man-like apes, we were not told that these apes have a huge air-sack packed away in front of the wind-pipe, and amongst the muscles of the neck,[1] rendering the man-like apes very unman-like, and utterly unable to speak: so that we are not of them, nor they of us? If they knew of this, why were we not informed? If they did not know, it was ignorance that exalted the monkey and abased the man. Knowing, moreover, that the power of uttering articulate words is not found in races possessing structures nearest in likeness to man's; but in creatures, such as Parrots, with vocal organs so different to ours that it is not easy to trace the analogous parts; surely, our scientific teachers ought to remember what Pascal said—"It is dangerous to show man how much he resembles the beast, without, at the same time, indicating his own greatness."

We accept evolution so far as verification warrants; but when those who profess to explain everything lower than man until there is "no essential difference between the drowning of a superfluous baby, and a superfluous kitten"—for no faith means no morals ultimately, we disregard these

[1] "Cassell's Natural History," p. 67: Dr P. M. Duncan, F.R.S.

teachers of little science and of less faith. We are sure that there is "an end worth living for—an end that is supremely good for us to gain, and supremely ill for us to lose—an end that we can only gain by virtue, and must lose by vice."

The case, as to folly, may be viewed with somewhat more largeness.

Physical Science, properly so called, concerns the relations between natural phenomena and their physical antecedents. The investigation is conducted by processes of mathematical reasoning as to whatever regards quantity and conditions of space. A lower department of natural science, phenomenology, examines and classifies phenomena; and infers, by induction, their laws. These laws cannot, however, be determined as the necessary results of physical energies until so interpreted by the higher science. The subordinate science has of late invaded the province of the higher; and, no longer servant, masterfully asserts, with high-sounding phrases, that though the world was not made, in any proper sense of making, all powers are mechanical, all mysteries can be explained by the laws of tangible matter and its energy.[1]

On examination, we find no clear evidence in favour of this wide assertion. Matter, simple as it may seem, "is the complex of so many relations, a conjuncture of so many events, a synthesis of so many sensations, that to know one Real thoroughly would only be possible through an intuition embracing the universe."[2] We find even that scientific conviction of the objective reality of matter is discovered only by experiment under the guidance of mind; and that Heat, Light, Sound, Electric currents, are real and objective existences though, not matter, but forms of energy. A shadow, or reflection, is real—though not a solid; a motion is real, though not a substance; a feeling is real, though neither substance nor motion.

As to scientific conception of matter, we find it convenient, in mathematical reasoning, to dispense with the ordinary meaning of the word; and, in place of the hard atom, to suppose a mere geometrical point "with repulsive and at-

[1] *Church Quarterly*, April 1876.

[2] "Problems of Life and Mind," vol. i. p. 343: Geo. Henry Lewes.

tractive energies tending towards or from a certain point,—but nothing at the point." These points are fictions without relations, solidity, extension, or colour. Nor is that all, physicist and metaphysicist both admit that we never touch matter, never see it, never hear it: our perceptions are symbols of the externals, but are not more like them, and have no more community of kind, than a numerical figure has to the form of the numbered objects; indeed, our sensations are merely mental affections which are called up by impulses on the nerves. Our notion of Matter, as well as of Mind, "is the notion of a perpetual something, contrasted with the perpetual flux of the sensations and other feelings or mental states which we refer to it; a something which we figure as remaining the same, while the particular feelings, through which it reveals its existence, change." [1] On one side is the world of forms, of colours, of movements; on the other is a mirror which reflects their images; not in any respect a plain transcript, but an ideal picture of external order. Sensations, terror, hope, calculations, are psychical phenomena associated with molecular motions set up in a previously prepared brain; but we do not know the causal connection, if any, between the objective and subjective—between molecular motion and the state of consciousness. In astronomical speculations, likewise, we take into account dark stars, scattered through space, hidden from observation not being luminous; so, in everything around and within us, innumerable hidden factors are at work; and he is a rash man, no true philosopher, who asserts—"Matter is the beginning and end of all."

Indeed it may be demonstrated that the mechanical theory utterly fails to explain the origin of the world. The following experiment seems to have been made first of all by Prof. P. G. Tait:—

Suppose that we have a wooden box: at one end is a large hole, we remove the wood from the opposite end, and in place of it affix a tightly stretched towel. To make the air visible, when expelled from the box, sprinkle the bottom of the box

[1] An Examination of Sir William Hamilton's Philosophy, p. 205: John Stuart Mill.

with strong solution of ammonia; then put into the box a dish containing common salt, and over the salt pour sulphuric acid of commerce. We have now in the box ammoniacal gas and muriatic acid gas, they combine and form solid sal ammoniac; and whatever escapes, that is visible, from the box, consists of small particles of sal ammoniac; and they remain suspended like smoke in the air. Now give a sudden blow to the end that is opposite the hole in the box; and, at once, a circular vortex ring moves, as if it were an independent solid, through the room. Observe, when two vortex rings impinge upon one another they vibrate like solid elastic rings. This vibration of a vortex ring can be produced, without any impact on another, by simply making an elliptical or even a square hole instead of the circular. The circle is the equilibrium form of a simple vortex, and if a simple vortex be produced of other than circular form, it will vibrate about the circular form as about a position of equilibrium.

The application of this experiment will yield important results.

It is a fact, discovered by Helmholzt's researches, that if the air was a perfect fluid—if there was no fluid-friction in it—that vortex-ring would go on moving for ever; and the portion of fluid containing the smoke would remain for ever the same set of particles; and could not be made by any process, except an act of creative power, to unite with the air in the room. Now if we adopt the supposition of Sir William Thomson, that the universe is full of this perfect fluid, something not like matter, but which really is matter, "*this property of rotation may be the basis of all that appeals to our senses as matter;*" indeed, that which we call "matter" may be only rotating portions of something which fills space—vortex-motions of an everywhere present fluid; but nothing less than creative power could produce a vortex-ring in a perfect fluid; consequently no mechanical theory, apart from creative power, can explain that which appeals as matter to our senses; or sufficiently account for the origin of the world.

In the whole of this process of reasoning concerning a perfect fluid and vortex-motion, we have been thinking of matter apart from its usual properties—putting ourselves outside of

it; or, as we may say, standing out of the body that we may look into the body so as to know the nature of it. We have been acting as if our spirit was an æolian harp thrilling to accordant tremors of the breath of life, apart from material touch,—learning of existence; and it is certain that by supposing a substance wherein thinking, knowing, doubting, and a power of moving subsist, we have as clear a notion of the substance of spirit, as we have of body.[1] Now, if this be so, it is unwise to doubt as to the existence of spirit; seeing that, as philosophers, we can only know of other things by its means; and to doubt of that by which we know, and to believe in that which we should not know, were it not for the other, is in the highest degree unreasonable.

The case is not made better, as to Matter and Nature, by the assumption that vortex-motions have been from everlasting in the perfect fluid; for no mechanical theory can account for their existence. There is no help in the contrary assumption, that no perfect fluid exists: for, then, without continual restoration of energy, which no mechanical theory affords or sufficiently explains, the universe would long since have burnt out. We conclude, from the whole argument, that neither for primal origination, nor for successive restorations, does mechanical power yield the equivalent.

A similar process of investigation may be carried into the unwise assertion as to the physical intervention of the Deity in human affairs being to the scientific thinker, *à priori*, so improbable, that no amount of historic testimony suffices to make him entertain the hypothesis for an instant.[2]

The fact that all sciences, specially that which concerns the Dissipation of Energy, points to a beginning, to a state of things incapable of being derived by means of any existing laws from any conceivable previous arrangement,[3] is proof of physical intervention; therefore, that which is unwarrantably declared "*à priori* improbable," becomes a matter of actual science; there have been physical interventions, or all our knowledge is at fault.

[1] "Locke on the Understanding," Book 2, ch. xxiii. § 5.
[2] "Cosmic Philosophy," vol. ii. pp. 379, 380: John Fiske.
[3] "Recent Advances in Physical Science," p. 26: Prof. P. G. Tait.

We take outside things, either as materials for the scaffold of our argument; or, using them as a sort of algebraic symbol, submit them to the necessary operations for ascertaining the unknown quantity—whether of Divinity or miracle; and thus proceed:—

The agency of light is wave-movement, but the moving agent we know not; the mode of operation by chemical affinity is known, chemical affinity is not known; the laws of motion seem to be laws of heat, we do not know what is moving nor how it moves;[1] but our conviction of the existence of the unknown is verified by experiment.

We can now advance somewhat further—Do we know all Nature's combinations? Certainly not; for many of its operations are wrought by means of a complexity so extreme as to be an almost insuperable obstacle to our investigations. It is impossible, therefore, for men to have any evidence which can be accounted sufficient to enable a scientific thinker to conclude that miracles are, *à priori*, improbable.

We will now try another mode of investigation.

Though human consciousness is brought into connection with material things only by means of nervous tremors—a neural process, it is easy notwithstanding to conceive of a succession of sentiments, of consciousness eternally prolonged; indeed, our recollections are not limited to the present—they embrace the past, and our expectations take hold of the future. There is organic union throughout: our thoughts are not separate beads, but as a necklace; and the string is "organic union,"—so we continue to be ourselves. If we say—the Mind is a series of feelings; we are obliged to complete the statement by calling it a series of feelings which is aware of itself as past and future. Then we are brought to the alternative of saying that the Mind is something different from any series of feelings; or that a mere series of feelings can be aware of itself, as a series, which is absurd.

Now in all this, as philosophers who have most carefully studied it decide, "there is no need of substance, except

[1] "Natural Philosophy," vol. i. p. 311: Thomson and Tait.

as the support and bond of phenomena;"[1] but the ego, our own mind, is the real existence. As we proceed in investigation, the lines become finer and finer, and are concerned with new unimaginable elements, though the process is "thinkable;" until we are conscious that, go far as we may, an untried universe lies beyond; a region of

> " The measures and the forms
> Which an abstract Intelligence supplies,
> Whose kingdom is where Time and Space are not."

We may conveniently turn the argument. Our consciousness of existence may be thought of as pages of algebraic figures which the scientific student reads off into the splendour and variety of light, with untold gradation of blended colours; or as notes written on the mental tablet, which a musician stirs into sweetest and complex harmony. Hence, arguing on scientific principles, we have an actual revelation, directly or indirectly, in signs and symbols to our thoughts, concerning things material and immaterial; and the laws of thought are laws of our organism. Scientific truths, like spiritual, have for ever been descending from Heaven to men. They are waves of the universal flow of existence. Concretes and their abstractions are as the convex and concave of things, the outer and inner meaning, as body and soul, as sides to the tablets of our mind, and the matter and meaning of the stony leaves of history. All modes and all grades of knowledge, at all times and in all places, are only differentiations; therefore our intelligent consciousness, our reasoned faith as to the unknown, our convictions and experiences as to fine lines of intelligence and emotion extending beyond the world's material surface, claim a place within the domain of human intellect. Not only is Revelation to be found in Holy Scripture, it is an essential part of our consciousness concerning the Almighty's operations; it binds everything that is natural into one splendid unity; it is the bond of continuity in all existence, and renders the mind of man, in its concentrated view and comprehension of Nature, a symbol of the complexity and mystery of the universe.

[1] " English Psychology," p. 119 : Th. Ribot.

Further :—

It is demonstrably certain, if Materialism is true, that we cannot take a step physically or mentally, religiously or morally, but in the way and according to the thoughts of the millions who have gone before us. It is not given to any man, however endowed, to rise spontaneously or quickly into intellectual splendour, there is no break, no solution of continuity. At any and every given moment of our history knowledge has limits which it cannot pass, and every one of us is weak, standing alone.

As if to disprove this mechanical theory, an unknown law intervenes. The thought and work of other men converge in us ; the long travail of past centuries—the patience, experience, emotion, thought of all former ages, make us what we are ; and this rule or empire of the dead is a great and increasing empire ; not a small and measurable thing, the interpretations are illimitable, a reservoir of experience for all the living. Hence, we fairly argue, the human mind is not a gloomy cave, or winding passage leading no whither, dimly lighted with mirage of baseless opinion ; but, gathering rich stores from the past, carries forward the whole man towards fullest truth and greatest good.

Such a revelation, from ancient source, of unknown and forgotten things, disposes for ever of that huckstering traffic which would measure the exercise of thought, the flight of fancy, the brilliancy of creative genius, and sell it by weight over the counter of physical experiment. The psychical laws of it are real, true, but further reaching than the physical ; their effects may be likened to those thrills of the earth seen and measured in magnetic mirror ; so that to our mental centre there is a revelation of things that are not of our own creation, and an interpretation as if a Hand played with Divinely ordered variety on the chords of our emotion : emotion, which giving grand conception of mysteries and supreme events, makes the successive ages spectators, and the great souls of all periods contemporary.

We may enlarge the fact.

Energy and brilliancy of thought not being of unvarying quantitative or qualitative stability in an individual, a race,

or a period, we are not surprised by appearances, when and where least expected, of great and sudden splendour. The progress not being uniform, but intermittent; gathering strength in the clearness consequent upon repose, or by mighty wrestling, some thinker of exceptional power thrusts aside barriers, and wins a wider circle in which thought entrenches itself, thence to go forth with new strength once more to conquer. This thrill and interchange of energy acts as by a spurt, or without any known parentage of antecedent thought. Enormous distance comes between the experience of Pythagoras and the scientific computations of Newton, between common minds and the genius of Shakspeare, between profane persons and men of piety. Throes arise out of the long travail of centuries, from the trouble and struggle of a million workers, and, by passionate exercise concentrating much light and power, turn common places of effort into miracle-scenes. This accounts for Moses, a slave, delivering a nation of slaves—rendering them free men; and giving laws which evermore preserved them, as a pure race and a peculiar people. This shows how holy Apostles, not having movement and tone from their age, received sparks of new world-enlightening thought from Jesus Christ; this was real inspiration.

Timid souls exclaim—"Let us leave one another alone; keep to your own province, do not enter ours; let there be peace between us." This will never do: the pact can be observed only so long as neither party is quite in earnest. By no treaty can the domain of truth be divided. No bargaining nor fencing off, nor any form of process, will maintain artificial barriers against inquiry, or bar the right of way: blessed right, enforced by rightful power. The natural world and spiritual world, the intellectual and the emotional, cannot be separated in any such fashion. That fatal objection —"It is not true," will cast down any system. Truth will not admit nor allow a lie. Every truth, whether physical or psychical, is connected with every other truth; and especially with Him who is the centre of all. Science, therefore, must be allowed, without suspicion or hindrance, to pursue her own proper work. The Church will certainly, despite all hindrance,

do her work; nor is it limited to purely spiritual consolation, to academic speculation, or to mere philosophy; her work is of a very practical nature: you cannot cause it to cease from the pulpit, nor from the hearth, nor from the printing press, it will win and replenish the earth.

The Clergy, well aware of this, count it their special office to teach from the pulpit, and exhort in the house, concerning the great facts; Redemption, Sanctification, Everlasting Life. Not the precise antiquity of the human race—not the exact line separating allegory from history in Scripture—not the interval between miraculous operation and natural cause—not the reconciliation of the Supernatural with ordinary law—are to be enforced on the Holy Day; though it were well for fit men, with leisure, to show at the "week-evening services" what a good and holy thing is Physical Science. Most of them, and rightly, will do that they love most; and for which they are best fitted; enforce simple Bible Truth: that every man, as he lives and when he dies, may use Professor Henslow's prayer—"Washed in the Blood of the Lamb: enable me to submit to Thy Holy Will: sanctify me with Thy Spirit." Faith and Prayer of this sort will exist despite scientific difficulties, and outlive them. Truths, that seem simplest, are deepest; and in guiding those who have gone astray, helping the tempted, and consoling the troubled, our Clergy tell us what God has done, what Christ has done, what the Holy Spirit has done; and these truths—if they breathe in the thoughts, and burn in the words—are the power of God to the soul.

This teaching, throwing light into many dark places of the Bible, shows that the face which answered to our face in childhood, becomes, as we grow, a reflection of manhood in Christ; an intelligence, long unseen, becoming visible. This enlargement of meaning with our growth of understanding, and the rising of precept and doctrine into rules of higher discipline for the advancement of purity, had long been a matter of spiritual experience to devout minds; but the accurate scientific positive thought of the age has led to inquiry, whether those parts also which address our reason, and not so much the emotional and reverential faculties, do not

possess equal power of enlargement. What have we found? We have found that the excellency of the Bible above all other Books, and its peculiarity as the word of God, render it, what for want of better name may be called a spiritual organism (Heb. iv. 12). The words are not chosen and arranged as by a scientific man, nor do they contain latent systems of science; but, when scientific facts become known, the very truth of them confirms the old letter. As an artist beholds spirit and life on that canvas which, to a common eye, is but a dead picture; or as the sculptor sees genius live and move in the marble that, to another man, is lifeless; the believer finds the chambers of Scripture to be full of true and holy living things. There are some rare human countenances in which an honest homely look might be counted all; but in a moment, as if light from Heaven shone, depths of soul are revealed all a glow with love and truth: so is it with the Bible.

We respectfully ask scientific men whether cold mechanical narrow conception and interpretation of the Holy Book is not as scientifically wrong as some old conceptions of nature are actually false? Can a book exciting holy emotion, quickening pious resolve, overcoming the fear of death, enabling the low, the vicious, the cruel, to attain elevation sanctity and mercifulness, have its powers accounted for by mechanical arrangements? Are its peculiar construction—often setting aside our modern rules of grammar; its splendour of imagery—adorning every chamber of our mind; its array of facts and historic narration—delighting to confound our theories; to be interpreted, or corrected, or rejected, because some of us find that our systems are not in accord with its statements? Ought it not to be meted by another measure than the hard analysis of criminal-court procedure? We ask even the undevout—for surely godly emotions sometime move in them, a sense of the Supreme sometime possesses them, a desire for immortality in purity and truth sometime lives in them—whether these high spiritual parts are not more valuable parts of their nature, and more worthy of cultivation and reliance, than the carnal instincts which crave only to eat drink and be merry?

Let it be a matter of duty to develop the high, as it is a necessity to appease the low: with the mastery of logical methods and the accuracy of experiment, partake of those more elaborate delicate and comprehensive processes of thought and emotion which draw even scientific specialists to Scripture, to Faith, to God. If a critic asserts, "Shakespeare had no genius and Milton no imagination," will not men smile at his folly? Is it not greater folly to call Moses, one of the greatest of men, "a semi-barbarous Hebrew;" to account the Prophets enthusiasts, Jesus as wholly human, and the Apostles as deceived or deceivers? We cannot but hope that He who, in compassionate and unfaltering love, prayed for his enemies—"Father forgive them," will look from the Cross with His sublime suffering Human countenance upon the ignorant, draw them to Him and save them; and from the Throne regard them gloriously.

STUDY XXII.

THE KINGDOM OF GOD.

"Institutions are to be judged by their great men; in the end they take their line from their great men. The Christian Church, and the line which is natural to it, and which will one day prevail in it, is to be judged from the saints and the tone of the saints."—*The Church of England*—MATT. ARNOLD.

"FROM the consideration of ourselves, and what we infallibly find in our own constitutions, our reason leads us to the knowledge of this certain and evident truth, that there is an eternal, most powerful, and most knowing Being"—these are the words of John Locke.[1] The existence of God is a verity real as are mathematical axioms, so thought Descartes—the Infinite, Eternal, Unchangeable, Self-existent, Omniscient, Omnipotent, Creator, is God.[2] If we add the belief of Malebranche, that God acts in all things by the counsels of wisdom, and by inspiration of love; taking also Newton's words—He is not eternity and infinity, but Eternal and Infinite; not time and space, but the Ever-Living and Ever-Present in whom time and space have existence and foundation; "Non est eternitas et infinitas; sed æternus et infinitus; non est duratio et spatium, sed durat et adest. Durat semper et adest ubique, et existendo semper et ubique, durationem et spatium constituit."[3] We form that idea of God which our conscience and Holy Scripture approve; and conclude with Descartes—"God is the first and eternal of all the truths which can possibly exist, and the One from whence all others proceed."[4]

On this fact, the First Study—"Intelligence is not divorced from Piety," was established.

[1] "Human Understanding," Book iv., Chap. x.
[2] "Discourse on Method," i. p. 161.
[3] "Philosophiæ Naturalis Principia Mathematica, Scholium Generale."
[4] "Letters," i. p. 112.

The same truth may take another form. The perfect life is that most conformed, not to blind appetite, but to the enlightened desires of wisdom. Consciousness of this leads to the conviction that an infinite guiding Mind holds all events within its control, and says to every surging wave—"Hitherto shalt thou come, but no further." This intelligent Governor is a personal God: for knowing, as well as we can know anything, that our own wisdom cannot spring from a world of blind fatality, without intellect, feeling, will; we also know that the world is not one huge terror, rolling on with mighty speed and energy, mind-less, reason-less, soul-less, crumbling our every hope into disappointment, but a world under the control of God. Of this God are all things. All things are not God, for then there would be no God separate from the world, or above the world: our God energizes in all, through all, over all; is beautiful with a love sublime beyond human conception, glorious with magnificence of goodness, of wisdom, of might, so that not one living thing is too minute for His care or too stupendous for His strength; the sun in the midst of heaven or a mote in his beams, the destiny of an empire or a tear that glistens in an infant's eye, are cared for by One infinite to feel, omniscient to guide, omnipotent to save. Life, conscious of such a God, loving and obeying Him with fervent emotion and clear intelligence, is highest life; the happiest, the fullest; because it satisfies the purest desire of our being, gives reality to virtue, truth to religion, and sacred unity to society. To this may be added—the existence of God is written as a law in human nature; and is the immortal original which men have sought to transcribe in all their faiths.[1] "No fantastical art of juggling with words," nor sensuality of low animal-men ever stifled our consciousness of the Supernatural. "We have a more certain knowledge of the existence of a God, than of anything our senses have not immediately discovered to us."[2] The desire of all nations for freedom of conscience is not because of unbelief, but a yearning for inquiry to establish more belief. The best man, the man in whom piety and intelligence are combined, will

[1] "Descartes' Ethics—Liberty," part v., prop. xx.

[2] John Locke. "Human Understanding," Book iv., Chap. x.

say, as Plato did long ago—"The world is guided by an accompanying Divine Power, and receives life and immortality by the appointment of the Creator." [1]

In the Studies of "the Supernatural," "Threshold of Creation," and "Rudiments of the World," we arrived at the Creation as a fact; and that we are not "a crowd of wretches, equally criminal and unfortunate," but children of God—not looking from the outside into halls and saloons; but, being tenants of a spacious house, all doors are thrown open to us. Nevertheless, though competent to labour, mentally capable of investigation, and spiritually desirous of knowing whence we came and whither we go, we cannot comprehend the influence of spirit on matter; nor how it is possible for any being, of whatever kind, to go forth from his own sphere to influence the development of another being—whether of the same nature or of different kind; in fact, the effective real physical action of one substance upon another substance is really "unthinkable;" and, therefore, the actuality of it in nature is "unthinkable," is a continual miracle. Science will have no miracles, and says—"What is so absurd as perpetual miracles in nature?" Yet, behold the marvellous spectacle presented by the Universe! It is one splendid, universal, all-comprehending miracle. We have an infinite number of energies acting in, by, and through matter; of living units, the same in essence, but different in degree of development; these different degrees are classed in families, orders, species; and rise, by continual gradation, from brute nature, in which life sleeps, to life's spiritual awakening in the splendour of human nature. We have to connect minerals and plants, animals and men, things gross and things sublime, all that can be imagined and not imagined, our own world and existences in other worlds, with the infinite whole of the universe. All these existences, mixed with one another, alike and unlike, capable of continuing their life through innumerable ages in successive evolution and transformation, so act, for, with and against one another, that the battle-sounds of life form a grand march-tune for the universe. Every existence is in, and to, and for, itself, a little world; representing, in diminu-

[1] "Plato's Dialogues—Statesmen," p. 270: Jowett's Translation.

tive mirror, the whole universe. Nor is that all: every creature is something which lives, not of itself: but continues by continual efficacy of the unknown energy in whom all the lines of life centre. Hence, the visible is the actual and continual outcome of the Invisible, a manifestation of the Supernatural, a splendid miracle.

An objection is thus raised—"A miracle is beyond usual law, and science declines to admit such weakness in Omnipotence." We reply—usual law is administered and explained by infinite variety of operation, and no man is able to limit even the power of a usual operation when an unusual element is introduced. To this may be added—it is gross presumption to imagine that we know all the operation of usual law, and are so acquainted with the whole course of things that we can say—"It would be a weakness in Omnipotence to act outside the usual course that we know of, in another course of which we do not know." These statements do not express the whole argument, which is manifold, in favour of miracles: we think, indeed, that demonstration may be thus given—The highest act of creation is to produce free beings: we may be sure that a perfect God will perform perfect work, and create these free beings. They must be finite beings: for everything created is so of necessity. These finite free beings must, in the roll of infinite duration, be liable to misuse their freedom: otherwise, they are not free. This freedom of action, both connected and disconnected with usual law, inevitably brings in new elements modifying law, requiring new procedure, and necessitating special operations of wisdom and power. These special operations are miracles, are actualities to meet necessities, and not out of but within the Divine plan, not marks of weakness, or of short-sightedness, but undeniable proofs that omnipotence and omniscience control all existence: guiding the free actions of intelligent moral responsible creatures, not in such manner as coerces, but by exercise of that suasion which is capable of producing those pure motives which result in right conduct as the fruit of choice and good will.

The Studies as to "Creative Words," "Days of Creation," "the Two Divine Accounts," and "Pre-Adamite Earth," could not explain the two great mysteries, which must ever

be buried in the depths of Divine existence, why God is, and how creation was possible: but we know that God was neither indifferent nor powerless as to the image of the universe eternally imprinted on His Intelligence: He realised it as a manifestation of Himself. The might of God, that was the worker; the love of God, that was the inspiring motive; the wisdom of God, that was the guide. Divine Intelligence is not circumscribed as our intelligence; and it is certainly better to speak of God's attributes as those of mind rather than those of matter.

Did God create the world from without Himself? If so, a being acting from without Himself is not Infinite, but as a sculptor who fashions from marble. Did God act upon chaos, as Anaxagoras said—Mind moving inert matter? or as the Demiurgos of Plato—Impressing luminous ideas of the good and beautiful? or did the world, being eternal, in virtue of God's secret aspiration, as Aristotle would say, move towards Him who attracts all things; yet in His Solitude and Bliss, regards them not? Put it otherwise:—did God create the world from within Himself? then the world is Himself, His substance, His life; and this is Pantheism.

How are these difficulties, as to a personal God, and as to Pantheism, to be overcome? A personal God is an Individual, not an absolutely abstract notion which we form concerning infinitude and universality; but the I Am, the self-existent and all-perfect Being. Do we, by this Personality, represent to ourselves a superb idol, who truly may dwell in Heaven—that is, a limited space; yet, though we load him with brilliant gifts and magnificent attributes, is but a dwarf in comparison with the Infinite whose abode is immensity, and whose duration is eternity? Certainly not: for the more we meditate upon the problem of creation, the surer our conviction that all difficulties arise only from our ignorance; whereas Pantheism contains fatal contradictions.

Pantheism reproaches Scripture for making God like man, yet falls itself into something lower than anthropomorphism—grossest materialism; by attributing the properties of matter, and the imperfections of creatures, to the Creator. There

is nothing more contrary to the idea of perfection, than that it should develop; yet this is the Pantheistic illusion. Pantheists liken God to the activities of the universe; make Him a being who changes, who develops, and consequently is infinitely short of perfection. Nor is that all: their God, without the world, is incomplete; a God—wanting essence, a power—without effect, a cause—without activity, wisdom—without purpose, love—without object; such a god, without the world, is no God.

Our God, the Personal God, is the Principle, the Spirit, the Universal, who inhabits heaven, earth, infinity, and eternity; He is not, in creating, as a Michael Angelo drawing forth Moses from a block of granite; He is not, in His own life, as a grain of wheat germinating; not as an oak extending its branches; but with profounder energy and more sublime activity than matter can exhibit, or we conceive, He exists and creates. He must not be conceived of as under the necessity of acting from within or without Himself; such conceptions are human and finite, have their limits in space, in time: God is Infinite, Eternal, Perfect. God is self-sufficient and complete, but the world is in course of development. God is in eternity—as the Eternal; the world is in time—as the temporal. The moments of time do not compose eternity; time is neither within nor without it; and, yet, eternity is the reason of its being. In like manner, the world which is incomplete—but becomes complete, is not strictly either within or without Him—the Eternally Complete; yet, He is the reason, cause, founder of it. The relation is unique, incomparable, mysterious, but a relation certain and demonstrated. Whatsoever is gross in words must be laid aside and the inner spirit only regarded: God, in eternity, eternally sees time, space, the world. In time, He sees the expression of His eternity; in space, the expression of His Infinity; in the world, the expression of the communicable powers of His Infinite Being. Our happiness consists not, nor will it ever, of full enjoyment—nothing further to know, no more to desire: continual progress will find new pleasures, and ever discover new perfections in the Infinite and Eternal.

The Studies of Divine Operation in the various creative

Works of the Days, evidenced the reality, definiteness, comprehensiveness, simplicity and complexity of the Scripture narrative. In the Study, "Variety in Nature," a view was given of the endless versatility in Nature: Law is not bound with links of Fate, but beautiful in her freedom. In the Study of "The Invisible Universe," worlds were regarded as a vast procession from the unseen to the seen; to return in due order from the House of Time to the Eternal Dominion. By Follies of the Wise, we learn that there is a wisdom of the world which by its ignorance of God is proved to be folly. The argument, in all the Studies, has been variably and variously conducted; the inquiry unrestrainedly progressed along many lines of thought, that through intelligent intercourse with ourselves and nature we might see by reason, by conscience, by science, that the Bible, in giving a true account of creation, proves itself to be the Book of God: not an evolution—as a product of unaided human intellect; but a Revelation, by Divine Inspiration to man, of things wholly unknown by man.

We consider, from the whole argument, that our spirit and its laws of thought, our soul and its inspirations, our heart and its wants, testify that the Divine existence, giving reality to the Universe, bestows moral and spiritual personality on man. We are not things, but persons. Godless, we are an inexplicable enigma: possess neither mission on earth, nor hope in Heaven. Godly, we rank as chiefs on earth, and are free; being free, we are responsible. Regarding natural laws as ordinances of God, we distinguish concerning these ordinances: some we obey, some we resist; and our disciplined freedom seems to be a gleam of some more glorious Freedom, some greater Reality.

"The Kingdom of God," our present study, has several times and meanings allotted to it: 1. The Gospel period; 2. The kingdom for which we pray—"Thy Kingdom Come;" 3. The kingdom of Glory. Not in any of these senses, but in the large meaning of God's Providence and Spiritual Rule amongst men, is it now to be considered. Our investigation, therefore, is as to Religion in the world generally, and will aim at the

establishment of sound knowledge concerning our Christian Faith: according to which Faith we believe that God is distinct from the world, is a living God, possessing His Own life; a God to be worshipped, the Creator.

Religion and History possess a kind of organic existence, which, when understood, enables us to explain, by general laws, many past and present phenomena of human life. We can calculate and enumerate special faults habits and vices of mixed communities; and see the agreement of immense multitudes as to traditions and beliefs, "quod ubique, quod semper, quod ab omnibus creditum est," extending from remotest periods to present time; from primitive culture until the high Faith of Christianity stands complete in doctrines, rites and ceremonies. It is thought that we can trace the natural growth of Faith in the world; as if it were, at first, of human origination; and, at last, a product of human culture. It is asserted that evidence as to the ancient phases of religious consciousness; evidence concerning the nature meaning and practice of rites and ceremonies; evidence of their transmission, expansion, restriction, and modification; will give a natural and human explanation of the most sacred and high powers of religion.

The fault, or weak part in the Natural Philosophy of Religion, is that as the culture of science and art, of history and philosophy, displays a world-long evolution of civilisations wrought out wholly by men in their ascent toward highest development; the same process is assumed as to religion, but the great fact of the Supernatural, on which all religion rests, and without which all religion is vain, is either denied or persistently ignored. Ignored despite the truth that, from earliest days till now, the universal consciousness, conscience and intelligence of mankind, accepted and accept the Supernatural. Ignored despite the fact that, Christianity, Mohammedanism, Brahmanism, Buddhism, Zoroastrism, and all other Faiths down to lowest brutal Fetichism, claim Divinity in their origin and continuance.

The folly of ignoring the miraculous becomes more evident when we learn—"the relation of savagery to barbarism and semi-civilisation lies almost wholly in præ-historic or extra-

historic regions. . . Direct history hardly tells anything of the changes of savage culture. . . . Perhaps no account of the course of culture in its lower stages can satisfy stringent criticism."[1] The philosophy of religion, which professes to account for the origin, nature and development of religion, is confessedly ignorant of that origin, and can trace the course only a little way back. Moreover, Mr. Tylor says—"Separation of intelligence from virtue, which accounts for so much of the wrong-doing of mankind, is continually seen to happen in the great movements of civilisation."[2] He adds—"ethnographers consider the rude life of primæval man under favourable conditions to have been, in its measure, a good and happy life."[3] Knowing, further, the fact thus expressed by Bishop Butler—"Mankind are for placing the stress of their religion anywhere rather than in virtue;" it seems, if the doctrine or philosophy of a natural evolution of religion be true, that uncultured ancient men devised supernatural restraints on vice and encouragements to virtue; but that cultured men, "in the great movements of civilisation," through unbelief discard those supernatural restraints and separate intelligence from virtue. The conclusion is irresistible—Religion, far from being an evolution by advancing intelligence, is that very thing which secularism, through dislike of restraint, sets itself to destroy.

This dethroning of virtue, banishing of the supernatural, and establishing the throne of mechanical or animal reason apart from those high emotional faculties which are the essence of humanity, has brought to trial the long and intricate world-history of right and wrong. In this trial secularism, while utterly refusing the supernatural, and undertaking accurately to formulate all knowledge, has been forced to own the remarkable fact that all natural phenomena rest on the transcendental—on the unknown. The tools that opponents of the Supernatural perverted into weapons of destruction are being restored to their real use: to clear, trim and adjust appropriate thoughts and facts for that contentment of religious

[1] "Primitive Culture," vol. i. p. 35 : Edward B. Tylor.
[2] "Primitive Culture," vol. i. p. 25.
[3] "Primitive Culture," vol. i. p. 27.

emotion and satisfaction of intelligence which are the great want of our day.

Some of the facts and processes of thought lie distant from us in time, as the stars are distant from us in space, but the laws of mind, like those of the physical universe, are not bounded by the direct observation of our senses. History, philosophy, science, are bringing to view factors of natural philosophy as foundations of positive morality—morality resting on a consciousness of the Supreme. Hence, scientific thought which, as by a polarising force, separated the natural from the supernatural to the utmost limits of repulsion, now recognises that—as in material things, so in spiritual—the ultimate cause is the Unknown, the Divine. The end of things, the beginning of things, are hidden in impenetrable mystery. We are naturally incapable of understanding the nonentity out of which they were drawn and equally unable to comprehend the infinity into which they are translated.

Proceed to the verification of this.

The order in which various stages of doctrine and rite succeed one another in the history of religion, and the fact that most of those doctrines and rites are not products of the particular systems sanctioning them, but results of previous systems, carry back all knowledge of religion, as universal, to that early stage which is præ-historic or extra-historic. Hence, religious feeling springs from that universal desire of the human race to establish a relationship between itself and those super-human and supernatural powers upon whose will the course of nature and the well-being of men are felt to be dependent. This fact roots religion in the beginning of the life of our race, in the deepest recesses and essential elements of our nature, and clothes it with the highest authority which antiquity, reverence and reason can afford.

The various symbols with which this consciousness may clothe itself, the external practices and forms of words, may change and die; but among all the superficial differences are a few certain unchangeable and undying truths. Only three need to be mentioned:—

1. The conviction of a Divine and Supernatural Power is always accompanied by an attempted twofold intercourse

with that Power: prayer, by which the worshipper communes with Him; and an asserted revelation from Him to the creature. In other words—"The religious consciousness regarded as a sense of the presence of the Divine in the universe and among mankind, is found in all stages of human history, and constitutes a primary efficiency in religion, in social life, and in civilization."[1]

2. There exists, it is affirmed, an abode in which men abide after death. "Looking at the religion of the lower races as a whole, we shall at least not be ill advised in taking as one of its general and principal elements the doctrine of the soul's Future Life."[2]

3. The reality of evil is an abiding conviction. Evil, as to the body, which no industry, no political arrangement can destroy. Evil, as to the soul, in its weakness and passions. We find it everywhere: it lies in the old Pythagorean doctrine of the metempsychosis. Of Plato it is said—"a tolerably complete doctrinal statement might be gathered from his works of the origin, nature, and effects of sin."[3] Polybius would check "the unruly passions and desires of man, by the fear of the invisible and such like tales of horror."[4] Cicero says of the sparks of virtue—"They are quickly extinguished by corrupt habit and thought so that the light of nature nowhere appears."[5]

In connection with these universal convictions exist holy places, persons, and things; to which are added observances, ceremonies, and rites: the outcome of an undeniable fact that God was prominent in the minds of primitive men, that they perceived a Spirit in everything, mysterious ghostliness in all dark space. No tribe nor people has ever been discovered in the whole course of human history that has not a religion of some kind or other. These religions are not indefinitely variable: the great moral truths are substantially the same. The Aborigines of Australia were said to have no

[1] "God in History," vol. iii., p. 302: Bunsen.
[2] "Primitive Culture," vol. ii., p. 19: Edward B. Tylor.
[3] "Christian Element in Plato:" Dr C. Ackerman.
[4] Neander's "Church History," vol. i., p. 8.
[5] "Tuscu. Quæst.," lib. iii., *in proœm.*

idea of the Supreme, no object of worship, "nothing whatever of the character of religion, or of religious observance, to distinguish them from the beasts that perish;"[1] yet in the same book are statements and traditions concerning supernatural beings, of the author of mischief in the form of a serpent, of souls, demons, deities. "No religion of mankind lies in utter isolation from the rest, and the thoughts and principles of modern Christianity are attached to intellectual clues which run back through far præ-Christian ages to the very origin of human civilization, perhaps even of human existence."[2]

This last statement is not perfectly accurate as to Christianity, which possesses essential truths of its own. Accept, however, as fact, that the similarity found in ancient faiths is so great that it must arise either from the relics of an ancient revelation, or from universal convictions interwoven with the very life of the soul. There is sufficient resemblance in Theologies to show that, for the most part, they rest upon a common consciousness of the supernatural; sufficient to show a dim confused recollection and tradition of a Divine communication; but not sufficient to enable us to gather out of other faiths our Christian Faith. A committee of inquiry could not collect Christianity from theologies, nor a representative counsel co-ordinate it as the growth of universal consciousness. Christianity is neither a development nor an evolution, it is alike a revelation and realization. "It is the blessed disclosure of that mystery which had been sealed in silence since the foundation of the world. . . . It is a bringing home to every living soul of that which had been the dim and latent hope of the poor suffering heart of humanity in all ages and in all times, but which never became an objective reality until angel voices on the slopes of Bethlehem sang of peace and blessedness to mankind."[3]

There is a moral order, a false and a true, a right and a wrong. Indeed, all intelligent intercourse with ourselves, and with the outer world, rests on our faith that the good is true, and the true is good. Not to accept this would conduct a

[1] "Queensland:" J. D. Lang.
[2] "Primitive Culture," vol. i. p. 381: Edward B. Tylor.
[3] Bp. of Gloucester and Bristol. "Modern Unbelief," p. 56.

man to insanity, and a race to stupidity: nor even in the stupidity of savagery is the moral element absent though scanty. Where formal precept fails, there exist traditional consensus and public opinion by which actions are held to be good or bad, right or wrong. Even where religion is separated from morals, as it greatly is in Barbarism, and even in some low forms of professedly Christian faith, the sense of morality is never wholly lost from consciousness and life. On this sense of moral order, of the reality of truth, rests our grand creed that sweeps heaven and earth, that reveals God to us as our Father and Heaven as our Home.

We will now transfer the argument from the convictions of men to the advance of art and science.

The similarity of early fishing, hunting, and warlike instruments, indicates that they were contrived almost instinctively by a sort of natural necessity; and these rude beginnings have advanced to the improvements of modern skill. Civilization, itself a work of skill, effects a general improvement of mankind; promotes human power and happiness by higher organization of the individual and of society; but the advance of civilization is not, necessarily, a growth of moral order. Some developments of science are positively evil, abounding in debasing arts, and a perfected sensuous godless literature, utterly corrupt. We try to make distinctions, to prove that the street-arab is a specimen of broken-down civilization—who never was civilized; and is, to the Hottentot, as a ruined house to a builder's yard; and we gloss over the hideous depravity and appalling misery of the dangerous classes in our large cities, but all in vain. Civilization does not, of itself, destroy either impurity or superstition. The ancient Etruscans, like the modern Chinese, are examples of skill and delicacy in goldsmith's work and ivory carving; we have not surpassed the Greek in oratory, or in sculpture; nor exceeded Rome in policy and law; but these arts of skill and elegance flourished, and still flourish in connection with abounding cruelty, profligacy, and impurity. So far from religion, or moral order, growing with the growth of civilization, all the great growths of civilization were marred by a separation of secularity from piety; and this divorced purity from manners.

The gradual evolution of the high moral spirituality of Christianity by human culture in arts and sciences is disproved by this fact.

Nor is that all: when we survey the flights and quaint fancies of primitive tribes, and try to trace them into a higher morality, no example of a forward path is presented. Existing savages have not advanced as men pressing forward to the light, they grope and stumble in darkness.

The holiest life ever looked on by the world, and the purest code of morals, are not found amongst the luxurious and refined, but amongst the Jews: a nation not eminent for skill in art, science, or secular culture; nevertheless their great men are the most remarkable that the world has ever seen, and assert the Divinity of Hebrew and Christian Faith.

If it be said—Epictetus and Marcus Aurelius were also moral heroes; and may, in some respects be compared with Jewish saints; the answer is, "We admit it; but they furnish the strongest evidence that their virtues were rather by intuition and indestructible consciousness residing in human nature; certainly not the product of civilization, for civilization in the age of the Antonines could not evolve any except a low type of morality." History proves that piety was not invented by savagery and is not established by civilization.

Yearning for a better life and for immortality was not created by secular culture; but that this sacred and mysterious aspiration prevailed among primitive men, may be proved by existing myths. Myths do not merely contain a rudimentary cosmic philosophy: an uncivilized race must possess considerable latent philosophy ere a rich mythology can be constructed. Arranging these myths in large assorted groups of ancient imaginative processes, the originating thoughts may be traced in different lands, for they appear with the regularity of mental law. The inner truth is always stronger and stranger than the fictitious surface: and these myths, as proving the well-marked and consistent structure of the human mind in all ages, are the very best history. They reveal ancestral heir-looms of thought; the texture of ancient minds; and while placing on record arts and manners, tell of philosophy and religion in times wholly lost from formal history.

The child-like and poetical fancy of early men recognized every natural event as the pictured or representative operation of personal life and will. It was Jove who stretched the rainbow down from heaven, as a purple sign of war and tempest; or, sent it, as Iris, a messenger between gods and men. Analogies, which to us are mere fancies, were realities to the ancients. The Death-goddess, stern, livid, grim; with strong-barred house and nine worlds of departed souls; Hunger—her dish: Famine—her knife; Care—her bed; Misery—her curtain; was a powerful being to the old Norseman. Whatever was seen gave birth to fancies, and fully to understand old-world myths needs not evidence, nor argument, but deep poetic feeling—the faculty of transporting the spirit into the atmosphere and romance of former life.

The thoughtful man traces in these myths a consciousness and picture-history of the work of God. Sometimes crude, narrow, repulsive, yet modern poets' fictions, however delicately shaped, want that reality of power whereby archaic forms acted with that immense effect on life and faith which the world has not even yet outgrown. Even if every myth were nought but wild lawlessness of imagination, having no pattern, whether in heaven or earth, what a wonderful land of genius did those early men win and occupy! These births from the imagination of the poet, the tale-teller, the seer, disclose so rich a fancy, such creative power, and mystic mazes of thought, that modern inventive poetic powers are put to the blush. Milton's sin and death sitting within the gates of hell, and their bridge across the deep abyss to earth, powerfully done, are true antiques. The modern fictions of artistic beauty and highly wrought fancies with which civilised man delights himself, possess not the reality nor freshness of the phantasms with which the ancients brightened their imagination and deepened their devotion. We have lost the key of mythic-cypher; but could we translate the complex shifting terms into reality, and read off the meaning in worship, love, adventure, war; their life and beauty would go far to prove that the masterpieces of imagination belong rather to the past than to the present.

Unconsciously often, and in despite of themselves, the

shapers of poetic myth and legend in their lives of gods, goddesses and super-human heroes, displayed the structure and operation of their own minds, the philosophy and religion of their own times, as if the earliest and highest fountain of thought issued from consciousness of the Divine, as a spring from Deity.

Amongst lowest races the gods of legend and worship are of mixed personality. Man is the type of deity, human society and government are models of divine society. There are chiefs and kings among men, and on high great gods among little gods; the difference being rather of rank than of nature. In after-times, culture does not invent, but develops amongst Aryan nations; and descends to lowest form in Fetichism. Sir Wm. Jones writes—"We must not be surprised at finding, on a close examination, that the characters of all the Pagan deities, male and female, melt into each other, and at last into one or two; for it seems a well-founded opinion that the crowds of gods and goddesses in ancient Rome, and modern Várânes (Benares), mean only the powers of nature, and principally those of the sun, expressed in a variety of ways and by a multitude of fanciful names."[1]

The statement of Sir Wm. Jones evidences that theology, even amongst rude races, rested not on the error—that there are many gods; but on the truth—there is one God: the Divine ancestor of men, the Shaper, Animator, Ruler, Spirit: holding up heaven, shining in the sun, and smiting with the thunder. Nature was the high-priestess, but not herself god; a symbol of Him, the Wise, Giver of Wisdom; of Him who is Good as True. Hence it is clear that a conviction of the Being of one God, is not an evolution from the highly cultured world-consciousness, acting on appropriate facts; but a primitive faith. This is further shown by the fact that some highly cultured races have low doctrines and rites; while others, not so intellectually gifted, form exalted conceptions of the Supreme. There is also among existing genuine savage faiths not only a rudimentary form of idea as to the deep problem of good and evil, but an effort to solve the mystery

[1] The First Anniversary Discourse before the Asiatic Society of Bengal.

by realisation of the good, and by victory over evil. The good, the valiant, all who excel, are heroes, divine men; symbols, though not understood, of Him who became Incarnate.

DOCTRINE OF SOULS.

As to the doctrine of souls, there are two beliefs: 1. Every creature has a soul capable of continued existence, therefore the dead chief's horse is slain at the tomb for use of the human spirit. 2. There are souls and spirits ranging from low degree to the high rank of powerful deities.

In the lowest levels of culture the notion of a ghost soul occasionally inhabiting the dead body, and in vision and dream appearing out of the body, is deeply ingrained. This faith inevitably leads to acts of reverence and propitiation. Part of the old culture and will-worship of souls and spirits survives in modern spiritualism.

It is believed that phantasms are ghosts; and that, being disembodied, they can enter the sleeper's mind, and excite perception apart from any external or objective figure. As to persons awake, spirits are said to be visible to some; and to others invisible; according to the will of the spirits. It is also taken for granted, both in rudest and most advanced culture, that spirits recognise one another by a likeness of the body retained in the disembodied state. Man's spirit, after death, lives in complete and abiding human shape:

> "Eternal form shall still divide
> The eternal soul from all beside;
> And I shall know him when we meet."
>
> *In Memoriam.*

"The theory of the soul is one principal part of a system of religious philosophy, which unites in an unbroken line of mental connection, the savage Fetish-worshipper and the civilised Christian."[1] This unbroken line of mental connexion, this universal and imperishable conviction, is found in the soul-depths of every human creature; and reminds us, though sometimes in rudest quaintest symbols, of a Spiritual Kingdom.

[1] "Primitive Culture:" Edward B. Tylor.

AS TO FUTURE LIFE.

In Zulu theology, not only do souls exist after the death of the body, but are spirits and deities worshipped by the living. In modern thought, the soul furnishes a more intellectual side to the religious doctrine of the future life; but, in all the faiths, however unintellectual, it is an essential. The most formal denial of future life, found amongst an uncultured race, is in a poem of the Dinka tribe concerning Dendrid the Creator:

> "He made man:
> And man comes forth, goes down into the ground, and comes no more."

There is, nevertheless, even in this tribe, testimony to belief in another life. Indeed the continued existence of the soul, after the death of the body, may be counted part of the universal faith.

Two forms of doctrine as to future life are found:

1. The Transmigration of souls, which ascending from lower stages has established itself amongst the huge communities of Asia.

2. The separate personal Existence of the Soul, found not only amongst rude and primitive men, but in the heart of Christianity—where it is at once an inducement to goodness, a sustainer of hope, and a solution to the problem presented by the mixed state of our present life.

The savage mind is generally incapable of a large and clear view of immortality; all dull and careless natures are wont to regard the world to come as far off, but the conviction of its reality finds expression in every definition of faith. Sometimes continuance of life is the main fact, sometimes retribution is the chief feature.

Four great regions are assigned to the dead: hell, earth, hades, heaven; and the conception of them does not sink into dreaminess, but is rather characterised by ghostliness. The low creeds have little moral element in connection with the state and place of the departed. It was reserved for our Christian Faith to implant righteousness and holiness, to give the inspiration of duty and love, and constitute them chief verities in the Kingdom of God.

FUTURE RETRIBUTION.

The idea of future retribution and different grades of condition is not universal, and some savage races seem in an intermediate condition between the continuance-theory and the retribution-theory, as if preparatory to that doctrine of future reward and punishment which has so great an import to human life. This confirms the New Testament statement that the revelation of a pure and glorious immortality is by Jesus Christ.

All races have the idea of the soul outliving the body in a country of ghosts; and all carnal men, whether of low or high culture, count a corner in this world the better place. In all faiths, except the Christian Faith, whether the spirit dwells with the body in the grave, or is secluded in a subterranean void, or abides in the dark classic realm of Hades, or occupies the Roman Orcus of pallid souls, or roams on the ghostly prairie of the savage hunter, the life is shadowy and dismal. The Sheol of ancient Jewish dead was, to common conception, but little better—a place where the dead met the dead. Nevertheless, we can trace amongst many barbarous nations germs of that holy comforting doctrine which lies at the very heart of Christianity; but the roads by which a happy land is attained are so strangely different that the path of life to one race seems to another a very descent into the pit. The chief idea in low culture is—what gives prosperity or renown here will give it hereafter; and present contrasts have reality in future existence: "the good are good warriors and hunters," said the Pawnee chief; but as the good, whatever it may mean, is a qualification for reward; the theory, even among lowest races, belongs to morality. The crude primitive faith pictures a spectral abode. The higher faiths more and more spiritualise the definite regions of heaven and hell into states rather than localities of happiness and misery. In the last hours of earthly dwelling men say of the coming change—"It is not death, but life." Mourners, setting aside the evidence of their physical senses, exclaim—"Life is not severed by fatal shears, only the bands of earth, the consummation is in eternal glory." The Christian Faith reveals a state of perfect purity; and to

aid our conception of it, brings to view a building of God, a house not made with hands, eternal in the heavens.

THE PRESENCE OF SPIRITS WITH MEN.

The familiar lines of Milton—

> "Millions of spiritual creatures walk the earth
> Unseen, both when we wake, and when we sleep"—

have lately had startling illustration.

Emmanuel Swedenborg, in "The Christian Religion," declares—"I have conversed with all my relatives and friends, likewise with kings and princes, and men of learning, after their departure out of this life, and this now for twenty years without interruption." Whatever we may think of this, and of spiritualistic theories, it is evident that spiritualism is not limited to the philosophy of savages. Materialists contemptuously throw it aside, not discerning nor separating the good from the bad; and now, that which they called savage knowledge, or no knowledge, is entering our higher civilization. The true interpretation is—men cannot rid themselves of the conviction that they and their world are really the objects and scene of spiritual strife.

The reality of this strife, deadliness of the evil, and bold resistance to it, may be taught by an old spiritualistic legend.[1] A Russian sat under a larch-tree when the sun glared like fire. He saw something coming from afar—it was the Pest-maiden, shrouded in linen, huge of stature, stalking towards him. Grasping his hand, she said—"Knowest thou me? I am the Pest-maiden. Take me on thy shoulders, carry me through all Russia; miss no village, nor town. I must visit all." She clambered on his back, and he stepped on; seeing the shadow of the form above, but feeling no burden. He bore her to the towns where joy and song prevailed: she waved her linen shroud, and joy and song were gone. In place thereof were mourning, tolling of bells, funeral processions, the graves could not contain the dead. He passed on, and as he came to every village shrieks resounded from

[1] "Primitive Culture:" Edward B. Tylor.

the dying, and all faces became white in the desolate houses. High on a hill, by the sea, stood his own hamlet; his wife and little children were there with his aged parents, and his heart bled as he drew nigh. Then, with high resolve to do or die, he grasped the fiend fast and plunged with her beneath the waves. She rose again, but, quailing before a spirit so fearless, fled away to forest and mountain, and was seen no more.

THE POWER AND DOCTRINE OF HOLY SCRIPTURE.

The attempts which have been made to discredit the claims of Holy Scripture as to Divine Inspiration, and to disprove Prophecy, have led to searching investigation.

A certain predictive power seems to be possessed by peculiar states of human consciousness, and prophecy of some kind has been found to exist amongst all nations. Apart from any sacred purpose, considering it as a mere faculty in the human mind, it is something distinct from intelligent thought and consciousness; but not inconsistent with them: it is a part of the relation of the Psyche to the inner and outer world. In Hellas the office of the Pythia, with the rational prophet or ὑποφήτης to stand beside her; and amongst the Jews, a school of the Prophets; are proof that the human soul was considered to be the organ of a mysterious knowledge of the future.

The power, in its lowest form, is a morbid condition of consciousness, or a sickly brooding enthusiasm; but, though uncertain in the degree and accuracy of prophetic enunciation, it has, through the whole course of history, obtained and kept power over stouter minds. In high states, or the spiritual grade, we speak not of the sacred and divine as found in Holy Scripture, the inward vision is allied with the faculty of recollection. It is related to, but is not what is called, demoniacal possession.

It is an error to assume that it belongs wholly to lower culture, and will be destroyed by higher medical knowledge. Higher medical knowledge will rather do well to investigate it as psychic power. In British India, moving, writhing,

tearing men are entered by a psychic power, and oracles are uttered. This kind of prophecy, or prevision, arose in times of, so-called, barbarism; continued in full vigour throughout the classic world, and exists now scarcely altered. Men, who naturally have neither ability nor eloquence, will, in the spiritual or possessed state, prophesy with earnest lofty declamation in well-knit harangue of metaphor and poetic figure.

We are not prepared with any explanation, and only use the mysterious fact as one of the many links by which human consciousness is united to a world of occult influences; and as example, whether good or bad, of the verity of that high and holy power which is manifested in Scripture. The relation seems to be somewhat like that of the divining damsel, at Philippi, to St. Paul and the preached Gospel (Acts xvi. 16-18).

These investigations, carried into fields of thought, worked for the most part, by those who refuse Holy Scripture, show that the attempt of physicists to limit the universe to material existences is in opposition to universal consciousness and experience. So far from matter being the whole and only reality, it is but as one small piece of furniture in the many-chambered House of God. There is world within world, even as there are stars beyond stars; and space, where we see nothing, may teem with a yet more manifold existence than that exhibited in known material forms. It is the high attribute of true Art and Science to suggest infinitely more than they express; suggestions that all material things are not carcases of the dead, but rather germs of life. We all, at times, have the shuddering impression, embodied by Coleridge in dark and fearful verse, that something not of earth is behind us; and he is less than man who does not weave wild contrasts of spirits, of heights and depths, of solemn mysteries, of immortal joys, of holy and eternal triumph:

> "A spirit moves within us, and impels
> The passion of a prophet to our lips."

Already are powers within us ready to be quickened into the life of manifold senses: senses by which we may see—not

with the eye; and hear—yet not by the ear; faculties enabling the soul to discriminate between spirit and spirit, evoking forms now coiled as in chrysalis web; that we may stand felicitously perfect in vital organization.

This is not romance, take an example, a cultivator of positive science, endowed with healthiest of human brains, Sir Humphry Davy. By inhalation of nitrous oxide, he was abstracted from all external things, losing perception of them. Trains of visible images, strangely linked with words, passed rapidly through his mind; so that he "existed in a world of newly-connected and newly-modified ideas." On awaking he resolved that the universe had its chief reality in the mind. If so slight a cause, till then unknown, gave exhilaration elasticity and vigour, refreshing, doubling the grandeur and might of intellectual man; what occult influences may run through all creation, establishing communication wherever beings live and think? Man already obtains favours that are marvellous; and, yet, he does but touch the infinite; can only meditate a little on evils that perplex—not disable and disarm them: can but desire the exquisite and perfectly good —not possess it.

We pass now to a definite examination of Holy Scripture.

The examination is useful, and capable of being conducted by ordinary minds. It aims at showing that the Infinite Spirit has entered finite nature; that the Voice, which past generations believed to be the Voice of God revealing deep mysteries, is a true Voice; that Christianity consists of a definite and positive body of truths admitting neither addition nor diminution except by Divine Authority: and that the Bible is not such a book as man would make, if he could; or could make, if he would.

The indications of unity in the Bible, despite being the work of many writers who were separated by wide intervals in time and space, render it impossible for the Book to be a work either of chance or of human contrivance.

More varied in its contents, in its writers, in its ages, than any other book; it lifts up unwearied testimony against the universal tendency to polytheism; and, as if to disprove the possibility of it being the product or evolution of human con-

sciousness, everywhere maintains a sublime elevated doctrine of monotheism. This Book, alone of all books, resisted and overcame the tendency to worship many gods; and declared, of the one God—"His is the greatness, and the power, and the glory, and the victory, and the majesty; for all that is in the heaven and in the earth is His; and He reigneth over all."

With the unique spiritual sublimity, is an inversion of the seeming relative importance of events. The rise and fall of empires, changes and revolutions which fill nations with terror or triumph, sure to be recorded on human page, have here little or no mention. A people obscure and despised, domestic scenes, family trials, traits of personal character, are invested with peculiar greatness as having some mysterious connection with moral government by the Supreme Ruler. The world rings with the fame of great captains, the earth shakes beneath the tread of innumerable legions, and the writers of this strange Book were not deaf; nevertheless, the Bible is silent and unconcerned, as sun and stars: only those events are regarded as great which bear on the development and issues of that spiritual empire or Kingdom of God, which, the Book asserts, is being founded and builded in the world.

While crowns and sceptres lie about as neglected things, the foundations of earthly morality are established on the fact of our intimate connection with Heaven. Human laws derive their sanction and authority from Divine Will: Will, determined by supreme rectitude, wisdom, and power, enjoining what is good, and claiming supremacy by right. This dominant idea subordinates everything to the ultimate triumph of a spiritual empire which establishes the happiness of man.

All other systems form two different spheres of duty—religion and morality: religion, separated from its chief root, fails even to maintain the soul's consciousness of God; and morality, apart from Divinity, becomes utterly corrupt. The Bible alone co-ordinates morality with religion; and so, is not in analogy with any merely human system; nor does it accord with the hitherto universal tendency of civilization to fall into secularism and lose spirituality.

History shows that human nature, left to itself, would never

have devised the moral code of Scripture; any more than the worm that crawls could claim the attributes of an eagle that flies. Patience, humility, meekness, spiritual purity, reliance on God, forgiveness of injury, are not, in the world's estimate, constituents of heroic character, nor most worthy of applause. These chief features of Bible morality are not at all the native utterances of human nature; and some, even modern men, doubt whether they really are virtues. Refined selfishness, systematic shrewd culture and indulgence of the natural appetites, self-assertion, are the worldly graces. Nevertheless, the adaptation and comprehensiveness of Bible religion are so great, that millions declare "every mood and necessity of our moral and spiritual life are therein exhaustively expressed." The morality and doctrine propounded are so exquisitely adapted to the circumstances of the nature which it guides, sustains, and exalts; and, yet, so out of the range of all that unassisted nature would suggest; that men, emulous of good, find their hearts filled with joy in realization of the good; and no more doubt concerning the Divinity than they doubt the evidence of their senses.

As to the Old Testament, every intellect, except the Jewish, is more or less at war with it now. In a sense, it may and does honour the Jews; but, so far from glorifying that nation, it constitutes, if false, one long libel; telling them that they are a "perverse and stiff-necked generation," refusing alike warning and reformation till they become a "hissing and a by-word among the nations;" nevertheless, as Pascal says, "they preserve it at the expense of their life."[1] Not in Barbarian, nor Jewish, nor Greek, nor Roman nature, do we discover elements out of which the Bible Religion could have been spontaneously evolved as a growth of national genius and culture; or as an ideally conceived deliberate fiction; or as an aggregation of myth and legend. What we do discover is a plain statement that human nature, far from being able of itself to erect a kingdom of immortal glory, is ever going down to mouldering rubbish, to utter and perpetual desolation, forgetting to take God into account at all; but

[1] "Cependant, ce livre qui les déshonore en tant de façons, ils le conserve aux dépens de leur vie."—Pensées, Tom ii. p. 189.

that God by patient endurance, by merciful forgiveness of sin, by propounding a holy law to work beautiful humility and desire after holiness, prepares men for a reign of righteousness. We hear as it were a sound, not from halls of philosophy, not from prince's palace, not from intrigues of statesmen: the sound as of ocean on distant shore, and a sweet strange melody of men and angels concerning issues of an invisible spiritual empire.

As to Christianity, so far from that being a natural growth of Jewish nature, it has roused, for nineteen hundred years, the undying animosity of the nation. The Messiah though, as Christians think, plainly prophecied of, shocked all their prejudices, and so evoked their fierce indignation that they crucified Him. It is not possible that the Jews should be able or willing to paint such a portrait. Man cannot transcend manhood; cannot, of himself, antedate and realise beforehand the ultimate perfection. Christ, both in personal character and in the essence of His teaching, is perfection: clearly beyond the plane of unaided human nature—a phenomenon to be expected, if evolution be true, in the future millennium, not one who has already fixed the admiring gaze of mankind for near two thousand years.

Taking Scripture as a whole, so far from being an outgrowth of human reason and philosophy, it is well nigh for ever in opposition to the wisdom of the world. Moreover, the antiquity of the writings places them at an earlier age than any in which such an evolution was possible. If the writings are not ancient and genuine, but modern and forgeries, how and when were they palmed on the nation as true? It must have been so cleverly done, that not a murmur of complaint has come down to us; not only so, the conception of such a Messiah as Christ was a revolution of the Jews' deepest principles. The spontaneous and natural projection from the Jewish mind of a Messiah, whose humble origin and condition, character teaching and ignominious death, have ever made Him an object of hatred to the race, is incredible and impossible. The only allegiance, moreover, which this Messiah accepts is a voluntary one, founded on the love of truth, the practice of piety, the exhibition of

holiness; yet, He claims universal empire; and predicts His own supreme rule over heart and mind and will throughout the world. In connection with, and a means of winning, such wide domain, is an intense spirit of proselytism: the Gospel must be proclaimed "to all nations under heaven," and preached "to every creature:" nevertheless, no sword must smite, no violence compel, no persecution hurt opponents; every victory must be gained by truth, graced by purity and illumined by love. The rights of conscience are held sacred, and the principle of toleration is consecrated. Such a system, to the Jews, a paradox; to the Gentiles, contemptible; and to the natural tendencies of our race, contrary; could neither originate nor continue unless by superhuman illumination and power. The genius of man, the wisdom of man, the civilisation of man, whenever departing from this Faith—whether for esoteric mysteries, or rationalistic interpretations—have overshadowed and blighted doctrine and morality. Investigation confirms the affirmation—"the Bible is not such a book as man would make, if he could; or could make, if he would."

There are certain other peculiarities in Holy Scripture, of a remarkable and practical character, in which men, for the most part, go astray. The Via Intelligentiæ, the way of understanding is—"He that doeth the will of God shall know of the doctrine whether it be of God." This one simple rule is the surest method of advancing in the knowledge of Divine Truth; and, indeed, the only effectual way of learning things of a sacred and practical nature; it leads to, and keeps in the right path ignorant men, like the Apostles, though worldly-wise men find the path hard to find and harder to keep. The soul, possessing this rectifying instrument of obedience, soon detects where a fallacy lies; and, as by a touch, discovers between the living and the dead.

A second peculiarity is, that while an unspiritual man works that he may justify himself and win merit; Scripture requires that utter abnegation of self which leads a man to rely wholly on God for power whether to think or do—then, from this death of self, the believer goes forth, in the power of new life, to obtain higher life.

The third point is that union of opposites—wisdom and zeal, moderation and the wonderfully comprehensive morality, which, though free from minute rules, actually governs heart and mind, word and deed. A few striking, and some think absurd precepts—"pluck out even a right eye . . . give to him that asketh . . . love your enemies . . . do to others as ye would that they should do unto you"—bring more riches out of the Treasury of God than do the cases, judgments, and casuistical tomes of a thousand secular writers. Go to the Scriptures with robust good sense, moderation and charity; or go in a child-like spirit; and you have light to walk by, and strength to walk. As to "becoming all things to all men," or giving place, "no, not for an hour;" the manifestation of liberty and comprehensiveness of charity for "the weak brother," yet maintenance of that "unity of spirit" which produces highest uniformity; these directions assign the crown and glory of religion to Love, yet exalt faith without which is no hope.

The fourth peculiarity is the skill with which social and political rocks are avoided. Principles are laid down which purify society, and ultimately ensure upright government; being first efficacious for the individual, and afterwards for the mass; but the fanaticism of the Jews, the hatred of heretics, the passions of men inflammable as tinder concerning vicious social customs and political institutions, are not kindled into a flame; while social rights are vindicated, and limitations set to political power, by the gradual formation of enlightened opinion.

These and many other characteristics stimulate the inquiry —whence had unlearned men this wisdom, avoiding the fanaticism of the Jews, the excesses of the Greeks, the indifference of the Romans? The errors of the Huguenots are not found in them, nor the coldness of the Puritans, but a wise enthusiasm. Enthusiasm, effecting a greater revolution in the world than ever before had been effected; and with such moderation, sagacious control, sober firmness, that the precepts are evermore a terror to evil-doers and the praise of them that do well.

The New Testament was not written in Attic, but common

Greek. There are quaint idioms; scholars detect Syriac, Hebrew and Chaldee ruggedness; but, despite these, a purity and grace all its own, have won a name and place in the forefront of the world's literature. Argued against by an intellectual power which has never been surpassed; opposed by an organised worldly policy the like of which has never since been seen; and refused by the very people on whom, in reality, it conferred the greatest honour; it is manifestly the greatest moral power in the world, and the only source whence is derived true knowledge of God. We unflinchingly therefore adopt these words—"The Scriptures do not depend for their existence, or their obligation, on the contingency of human belief, but on the infallibility of a Divine revelation. They do not exist because they are believed, but because of the eternal truth of that which they reveal."[1]

The truths are objective—true before they are believed, and true even after faith in them is lost. They are subjective also—their influence being the result of immediate operation by the Holy Ghost on the human heart and conscience. This must be remembered in dealing with opponents of Scripture: we shall not prevail with them, unless we win our way into the conviction of the intellect, and into the affection of the will. We are also to bear in mind a fearful truth—"When with the Bible in her hand, and Jesus as her archetype, the Rational Conscience is seated on the throne, there will be also revealed worse and worse abominations of superstition and scepticism."[2] The two poles of man's nature, belief and unbelief, are acted upon; and as he wills there is negation unto utter destruction, or acceptance of that positive truth which gives light and saves life. We all have need to pray—

> "Let Evil die away in night,
> And Truth walk forth in joyous light."

View the matter somewhat otherwise.

Holy Scripture had origin amongst a people who were separated from mankind: to whom, nevertheless, it gave a sense of the one undivided race of man. In themselves, anything

[1] "The Bible and its Critics," p. 13: Rev. Edward Garbett.
[2] "God in History," vol. i. p. 14: Bunsen.

rather than representative of collective humanity; even now they may be said to dwell alone; their Book explains the tangled aimless movements of nations, and brings into harmony the jarring discords of varied destinies. From Moses to Malachi is a succession of spiritual and prophetic power during 1,000 years, which has nothing like it in the world's history: forty different authors, sixty-six different books, proclaim a Divine life in man, and that the Redeemer was to come of the Jewish flesh to make all other flesh akin. These men had inward perception of Divine things, high spiritual endowment from God, were heroes of moral effort, were gifted with Inspired speech. They illuminate the past with the true doctrine of creation, sanctify and beautify the present with the fact of everlasting Redemption, and reveal the future by declaring the establishment of a Divine universal kingdom. Then comes the New Testament, "Not in a barbarous age, but in the most instructed and enlightened age that the world had ever before seen, and perhaps in many respects has since seen;"[1] but, as if to show that the Gospel was not an evolution wrought by the world's wisdom, Peter, James and John, not philosophers but fishermen, went forth to teach the world. They were not endued with the wisdom of the time, not experienced in the ways of the world, not acquainted with any scientific, physical, theological, moral or social theories; they had been taught by one Jesus.

3. Pass from the men to the Books.

The Books, whether old or new, are in order as to time—being coherent with the circumstances of their date, and as to matter, congruous. Everything has due place in the successive steps of one indivisible yet exceedingly variable history; and in every part are symbols, allusions, prophecies, showing that the whole was seen from the beginning.

The predictions concerning our Lord's nature, and work, and suffering, are not fewer than one hundred and nine;[2] taken from nine and twenty books. There is no merely human development of doctrine, for—notwithstanding a progressive unfolding of the Divine scheme—the unity of a personal God,

[1] "Foundations of Religion:" Sir John Barnard Byles.
[2] Classified in "Simpson's Plea for Religion."

the creation and preservation of the world by His power, a particular Providence, the corruption of man, atonement through sacrifice, efficacy of prayer, human responsibility, the necessity of personal holiness, were as plainly stated at first as last. The whole being—not a human science, but a system of objective truth revealed by God, with subjective counterpart in man; not a growth of opinion, but an immediate revelation of Him who

> "Shapes our ends,
> Rough hew them how we will."

Verification of the whole, even to demonstration, may be obtained by any candid intelligent mind who reverently searches Scripture to discover those continuous lines of thought, of prophecy, of doctrine, of morals, of revelation, which run through the whole, making it one piece; the entire pattern of which was evidently foreseen from the beginning.

One line of prophecy, the Messianic, may be taken as example of the wonderful simplicity, accuracy, yet complexity of the prophetic portion. So soon as man falls by means of woman, restoration is promised even through that weak one (Gen. iii. 15). After the Flood, lest men think the ancient blessing has departed, the kingdom of God is re-established in Shem; and Japheth is to be received into holy community, and dwell in the tents of Shem (Gen. ix. 26, 27). Abraham and the Patriarchs are told that through them will come the Benediction of Nations (Gen. ix. 18-27, xii. 1-3, xlix. 8-10). Balaam's Prophecy (Num. xxiv. 17-19) is of a Star—the symbol of splendour in Divine Rule, and of a Sceptre—symbol of dominion. Against his own will, the man said concerning his enemies—"the Lord is amongst them." Moses' Prophecy, of a Prophet like unto himself, gave yet greater definiteness of view (Deut. xviii. 15-19). Afterwards, we learn that this Messiah is not only to be of Judah's tribe, but of David's family (2 Sam. vii. 12-16). The predictions in the Psalms are too numerous to mention. These may be profitably studied—ii., viii., xvi., xxii., xxiv., xl., xli., xlv., lv., lxviii., lxxii., lxxxvii., lxxxix., xc., cx., cxviii. Then, passing on, we find the Man of Sorrows (Is. liii.), the Lord our Righteousness (Jer. xxiii. 6), the Shepherd of Ezekiel (xxxiv. 23

24), Messiah the Prince (Dan. ix. 24-27), the Lord and His Goodness (Hosea iii. 4, 5), the Builder of David's Tabernacle (Amos ix. 11, 12), the Saviours of Obadiah (i. 21), the Salvation and Resurrection typified by Jonah, the Ruler in Israel (Micah v. 2), the Giver of Peace (Hag. i. 9), The Fellow of the Lord of Hosts (Zech. xiii. 7), and the Messenger of the Covenant (Mal. iii. 1). These are but a few out of many predictions which critical investigation, application and fulfilment in the New Testament, manifest as a light shining in dark places and in ancient times to testify of the Lord's Dominion.

This one line of investigation, well wrought, will bring conviction to any, possessed of acuteness and learning, who may wish to have understanding as to the reality of prophecy, the Inspiration of Scripture, and the establishment of God's kingdom. The truth will be found to deepen in meaning with the profoundness of his capacity. Sacred, like physical science, enlarges with the growth of human intelligence; and prophecy is, specially, a continual and an abiding revelation. It is like the speaking of God afresh to us in every fulfilment; and, with reference to Jesus, predictions in the psalms and the prophets as to His character and work, do, by the peculiar power of Scripture, so translate themselves into the believer's heart and mind that they continually renew his nature, and render his life Christ-like.

Doctrinal truths were not vague and indeterminate, but definite in their expression and transcendent in their sublimity.

These truths did not hold the world in amazement by means of Jewish genius, the Jew holds little place, apart from Scripture, in the world's mental history; yet, the Jew had the sublimest system of spiritual truth, the purest morality, the clearest knowledge of God. He brought a new life into the heart of the world. Deeper and deeper the truth struck its roots, wider and wider became its influence. The science of Babylonia, Egypt, Arabia; the subtle genius in philosophy, speculative intellect, vividness and vigour of thought amongst the Greeks; the wisdom of all other nations in the world; have failed: where they fell, the Jew rose; and soared with a flight true and lofty to the knowledge of God. He declared

that to be wrong which heathendom declared to be right, and that right which heathendom pronounced wrong. Centuries of thought had not advanced one step nearer to the solution of problems with which, child-like, it began—began with child-like question, ended with aged doubt. Jesus solved those problems. In what school had the Jew been taught that he, naturally a most bigoted fanatic, should nevertheless possess highest wisdom and purest faith? The greatest minds have seen no further, nor added one truth to religion, since John, the Jew, wrote of Love to God and man. Sin, Ruin, Redemption, Sanctification, Eternal Life, do now and will for ever form the great matters on which profound minds meditate: all that we know of these things has been learned from the Jews. We look at human science, and trace its hesitating course through ages of uncertainty and imperfection; but, turning to the Bible, we find it plainly stated that man is connected with the Infinite by place and authority; is related to the Eternal in origin; if he falls, it is to rise higher; if he dies, it is that he may live again. Brought down to the depths of humiliation, tried and tempted, the servant of God is nevertheless destined to highest glory. In his spirit, in the depths of his heart, a Divine voice proclaims the final overthrow of evil, the lasting triumph of goodness and righteousness among men.

There are other surprising facts which should not be neglected.

The great and wise of the world stood amazed, while prophets and fishermen did a work which they confessed was not their own—but by the power of the Spirit of God. They appealed to signs and wonders, marvels and miracles, as proof of their Supernatural authority; that powers of the world to come accompanied them, that the continual presence of God and the all-prevailing wisdom of the Holy Ghost gave them the victory.

During many ages we have not seen outer material miracles; but they may be evidenced and tested by the inner and spiritual. In the prophets' days and in time of the fleshly Christ, and in the times of those who had seen Him, visible signs were given; but signs having been given,

and the world having received a manifestation of the Divine Nature by Personal Presence, further proof was to be that of holy influence. Miracles have never ceased, but their sphere of action has been somewhat changed: they are now wrought within, not without the man. Every regeneration, every conversion from unfaith to faith, is a miracle; Creation is repeated in a new form (Gal. ii. 20).

Nor is that all—the "curiosa felicitas" of the Book has not vanished—no not even in its feeblest translations. It fits almost naturally into every language; it is easiest of all books to translate without great loss of energy, of beauty, of specific character; yet let any one who thinks that he can cast it in any mould but its own, endeavour to submit David's Psalms to our metre or rhyme; and his words will be as notes of a whistle to the majestic roll of an organ, or as the trickling of a rill in comparison with the "voice of many waters."

The Hebrews, in this Book, have embalmed the spirit, thought, laws, history, all that constitutes the life of a nation; while the Egyptian, Assyrian, Babylonian, whom the world account greater and cleverer people, have no such memorials—and should we at any time discover records, and bring them from out the tomb of centuries, it will be through a spirit of investigation excited by the Bible.

This race have done more for pure literature and true science, both as to God and man, than did the Greeks —celebrated for genius, than the Romans—renowned for government. The paradox is not diminished by their alleged insignificance and obscurity, but is explained when viewed as part of a Divine Plan. No fortuitous collection of tracts—written by men of unaided powers; could win the homage of mankind, and extort the passionate love of ten thousand times ten thousand?

The Book has become universal. It has evoked more literature than all other books in the world. Well-nigh every other book, that works any good, seems connected with this—either for or against; and, in the more than two hundred languages into which it has been translated, it reigns as king. Not only do children love it, the dullest of our race delight in it; the

feminine mind becomes more graceful and womanly by it; the masculine, more manly; and all the troubled find by means of of it a "peace which passeth all understanding." Men, in the front of all science learning and civilization, are everlastingly poring over it, illustrating, interpreting, translating, defending, or attacking. No pains are too great to make plain even its insignificant parts; and the greatest of wicked men, the Lucifers of ungodliness, will shout and roar if they find a mote in the light, or a spot on the face of this Sun. More than any other book it is quoted, it lives a manifold life in every School of Thought, is the delight of Painters, and suggests to Poets their most gorgeous conceptions. "There never was any book like the Bible, and there never will be such another." It is the Book for all men and for all time: as a phenomenon it is unique. Like an old oak, in its days and under its branches, the harvest of thousands of years sprang, ripened, and fell beneath the sickle of Time.

It is of no avail to say—"many sacred books have received admiration and reverence, there are always ignorant people, and nations in a low stage of civilization"—no book is like this: no other book contains so many writings all written by men of an obscure and illiterate people during the course of many ages, so full of variety as to events, so inimitable in style, and rich in mysterious endowment of the writers. No other book has been received, by power of moral persuasion, amongst nations and races of every conceivable variety as to origin, position, tradition, belief, language; and that, in days when men of loftiest minds guided public opinion. No other book has been so sifted, as to its evidence; so tested, as to its power; so tried, as to its purity. Its errors, if any exist, are not consecrated by law; its doctrines, when opposed, are not fenced in against hostile criticism; its principles, even enemies declare, can never be uprooted from our nature; it alone seems capable of raising a succession of men heroically bent on making it universal. No other book so vividly sets forth the doom of guilty men; and yet, the guilty are wont to read, admire and obey. Men weary and heavy laden, the sick, and those about to die, find rest—healing—life.

When, further, it is considered that the Book is one; yet the product of many men in many ages; by writers—neither conscious nor capable of co-operating; a portion now, and a part then; dreams, centuries separating, yet dreams strangely finding realization; disclosures made piecemeal, but so adjusted that grandest results are obtained from minutest beginnings; the proof of Divinity amounts to demonstration. The cylinder of the world's history—as it unrolls, art and science—as they advance, are found inscribed with hieroglyphics; and in the Bible are corresponding shadows, and depths, and enigmas; we have chosen for verification specially those by which Creation is made part of Revelation: if our proof is adequate the Book is shewn to be of God, who sent forth His Holy Men to be as levers to move the world, and His Holy Book, for a marvellous operation in establishing His kingdom.

When we consider Christ—as the Founder, Exemplar and King of our Faith; and as the Messiah, now refused, but to be accepted of the Jews; the originality and power of His character raise it above the plane of human nature—and yet, how human is it! Not in Roman, Greek, or Jew, can we discover the elements of so rare a creation. The Holy Personality was not the slow combined production of a world-moving spirit stirring a highly-gifted race; nor a moral development equipped in the school and cultured in the palace. The Child of poor parents, educated as a carpenter's son, nurtured in Nazareth, of almost homeless poverty: was it possible for such a child, if but a child, to become that God-man of work so mighty? Contrast His humility with Jewish pride, His charity with their fanaticism, His expansiveness and their narrowness, and you will say that He is of a nature whom they could neither produce nor invent. For nineteen hundred years He has been the centre and cause of all moral and spiritual development amongst the wisest nations; and outside of these nations exists little real knowledge. Around His life, work, death, the whole world gathers. His profound acquaintance with the human heart, His grand morality, His wonderful knowledge, yet He never stepped beyond the confines of Palestine, render Him the greatest of men.

He declared that the world should bow down to Him, the nations worship Him, that He should judge quick and dead. Are they pretensions of a straw-crowned Bedlam monarch? are they declarations of impious ambition, or midsummer madness? No, beautiful in humility, a little child is symbol of those who enter His kingdom. His bitterest enemies could not convince Him of sin. Around the Nazarene of obscurity, of poverty, of suffering, gathers a halo of glory which no hero, nor history, nor romance, can pretend to. He lived in holiness that knew no frailty, but conciliated human infirmity with heavenly sympathy. With courage that no fear could daunt, and no death dismay, He endured all horrors. His gentleness bound up the broken heart, and poured consolation for every mourner. "If the life and death of Socrates are those of a sage, the life and death of Jesus are those of a God."

At no other time, by no other man, was so supreme a start from low degree to higher life: none but Jesus could be Jesus. Some thousand workers come up in this century to be forgotten in the next; but the silver cord of Christ is not loosed, nor the golden bowl of His doctrine broken. Time sits as a refiner, the dross is cast away and the pure gold preserved; Time chronicles his centuries, and myriads die; Jesus, imperishable as gold, lives for ever. He binds the heart of the world to Himself with electric chain. He tells how the soul, weak and wandering like a storm-driven bird, may nestle in the bosom of our Holy Father. In the spirits of men, where sin has opened an unfathomable depth of anguish, He causes streams of consolation to flow and fill that depth. His loving touch causes the eye to sparkle with light, and our cheek to glow with the strangely sweet aspect of those who look into far-off worlds and gladly hasten thither.

We have not reasoned as to the evidences of Christ's Deity, nor attempted to unfold the proofs which shew Him to be in a higher sense than science can reveal, the Life of the World. We have been dealing with the erroneous reasonings and false conclusions which would overthrow the foundations of all Religion; which would take from life

everything worth living for, by banishing God from the world; and, in denying the Supernatural, would deprive man of his hope of immortality and lower him in his aims and aspirations to a level with the brutes that perish. We have thought it well not to confine ourselves to arguments against the Naturalist, but to set forth at some length the physical phenomena which science has investigated, that these marvels and glories of Nature may bear witness to Infinite Wisdom and Power. We have not fully realised our mental conception, but we take courage in the thought that the Eternal Truths do not rest for their support on human championship; they are God Himself speaking to the minds and hearts and consciences of men. Generation after generation passes away, but Revealed Truth shines from age to age with ever brightening flame. Philosophers, many shallow, but some of them profound, follow one upon another; every one of them in turn dazzling men for a moment, and then departing in the long procession of dead creeds to a common grave. Christianity alone has the power of an endless life. At those moments in history, when men have predicted the end, its youth has been renewed; and at this very time when its dissolution is confidently foretold, it is arming itself for new victories and is going forth to conquer the world. The kingdom of God thus contains in itself the evidence that it *is* the kingdom of God; and Supernaturalism is vindicated not by the arguments however conclusive of its defenders, but by its own continual and ever-growing power over men. Of philosophers and philosophies, falsely so-called, it may truly be said—"He that sitteth in the heavens shall laugh them to scorn." *Verbum domini manet in æternum*, and blessed are all who know it to be the Word of the Lord.

Those whom we have been refuting may not join in our prayer, but they may believe in its sincerity when we implore of the Infinite Unseen Power to reveal to them also the undying truths, and to lead them into the Peace of God.

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